Intrusive thoughts, crisis support and symptoms of post-traumatic stress disorders in adolescents involved in road traffic accidents

Thesis

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Abstract: This study aimed to survey an adolescent sample for the prevalence of PTSD symptoms following a road traffic accident (RTA). In addition, it aimed to examine the relationship between PTSD symptoms and a number of variables which have been suggested by Rachman's (1980) emotional processing theory to be important in the development of PTSD. Rachman's theory suggests that intrusive phenomena are indicative of emotional processing. His theory accounts for both everyday and trauma related intrusive phenomena and suggests that the same mechanisms are employed in both everyday and traumatic processing. This study examined the influence of controllability and affective discomfort associated with everyday intrusive thoughts on the levels of PTSD seen in adolescents involved in RTAs. In addition, other variables were assessed which were suggested by Rachman to be indicative of successful emotional processing (e.g. social support). 34 adolescents between the age of 10 and 16, who had been involved in RTAs were asked to complete a battery of questionnaires presented in a structured interview format. Each participant completed the Impact of Events Scale (Horowitz et al., 1979), the Revised Children's Manifest Anxiety Scale (Reynolds and Richmond, 1978), the Birleson depression inventory (Birleson, 1981), the Crisis Support Scale (Joseph et al., 1992) and two measures of accident related intrusive thoughts and everyday intrusive thoughts which have been adapted from previously used instruments (Salkovskis, 1985, Allsopp and Williams, 1996). A quarter of all adolescents involved in RTAs were found to suffer severe levels of PTSD psychopathology as measured by the IES. The experience of accident related intrusive thoughts was associated with higher levels of PTSD symptoms. Everyday intrusive thoughts, that were controllable and did not cause affective discomfort, were associated with lower levels of PTSD symptoms. Post-traumatic symptoms were predicted by accident severity variables such as collision speeds and degree of injury. Variables suggested by Rachman (e.g. controllability of intrusive thoughts) were found to supplement accident severity variables. While considering the methodological problems encountered, the results of this study are discussed along with their implications for clinical practice and future research.

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To M & D

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1.0 INTRODUCTION

1.1.1 Preamble

In the aftermath of a road traffic accident (RTA), medical services are readily available for the physically injured but consideration is rarely given to the long-term emotional needs of children involved in such accidents. Accident survivors and their families often have to cope with multiple stressors. These may include physical injuries and their long and short term consequences (e.g orthopaedic and neurological), bereavement, litigation and the less often explored psychological after-effects (Mitchell, 1997). To date, however, little has been written about the psychological after-effects of RTAs in children or adolescents (see Canterbury, Yule and Glucksman, 1993, Stallard and Law, 1993, 1994, and Canterbury and Yule, 1997). Much of this existing research is based upon trauma research carried out with children and adolescents involved in other transport disasters and with adults involved in RTAs. This research, therefore, aimed to systematically investigate the psychological after-effects of RTAs on adolescents and to investigate those factors which predict higher levels of PTSD symptoms.

1.1.2 Road Traffic Accident Statistics In Britain; Setting the Scene

In 1995, 3,621 deaths and 310,506 casualties of differing severity resulted from RTAs in Britain. Of this latter figure, over 43,000 were children (Department of Transport, 1996). Although this represents a drop of 10% compared to the 1994 figures, (due in the main to improvements in road and vehicle safety, see Department of Transport, 1996), RTAs can still be considered as one of the greatest risks of serious or fatal injury in childhood. In fact, for the age bands 5-9 and 10-14 years, road deaths represent a fifth of deaths from all causes and over 60% of all accidental deaths. Taking the under 16s as a whole, in 1995 there were 270 fatal accidents, 6,983 serious

accidents and 36,535 slight accidents on British roads. Of this latter figure, 16,460 casualties and 112 deaths were of children between the ages of 12 and 15 years. The adolescent group represented approximately 40% of all child casualties on British roads in 1995 (Department of Transport, 1996), and are therefore an important population to target for research.

1.1.3 Why Study Road Traffic Accident Victims?

Although the literature remains sparse, there has been a recent increase in interest in the psychological sequelae of road traffic accidents in adults and in children (Mitchell, 1997). Researchers are now beginning to focus on this population for a number of reasons. First, RTA survivors may have experienced a life stress as severe as survivors of major disasters. Second, RTAs affect a large number of people each year. Third, a RTA is a life event which contains 'some aspects of the shocking and unusual and many aspects of the everyday' (Mitchell, 1997 p.6). It is this 'everyday' quality which bridges the gap between disaster research and less traumatic incidents. Fourth, there is clinical, anecdotal and empirical evidence to suggest that some people develop post-traumatic stress disorder (PTSD) after RTAs. This research, however, does not aim to reach a diagnosis of PTSD, rather it is concerned with measuring post-trauma symptoms using the DSM-IV (American Psychological Association [APA], 1994) criteria as a guide. This criteria will be discussed next before going on to review the evidence for PTSD in children and adolescents.

1.2 DSM-IV CRITERIA, CRITICISMS AND DEVELOPMENT OF PTSD DIAGNOSIS

1.2.1.1 Diagnostic Criteria For Post-Traumatic Stress Disorder

To be diagnosed as having PTSD a person should have experienced a traumatic event followed by the development of a triad of persistent symptoms. These are re-experiencing of the trauma, increased arousal and avoidance of stimuli associated with the trauma. This latter group includes symptoms of emotional numbing. Each of these components will be expanded on below. When trauma survivors experience the triad of symptoms for more than one month a diagnosis of PTSD can be made. Acute, chronic and delayed onset PTSD can also be specified.

1.2.1.2 Trauma Criteria

The more recent DSM-IV (APA, 1994) criteria require that the experience of, and response to a trauma satisfy the following criteria.

i. **Experience of Trauma**: the person may have experienced, witnessed, or been confronted with an event that involves actual or threatened death, serious injury or a threat to the physical integrity of oneself or others.

ii. **Response to trauma:** the person's response to this trauma involved intense fear, helplessness, or horror. In children, this may be expressed by disorganised or agitated behaviour (DSM-IV, 1994).

1.2.1.3 Re-Experiencing of the Trauma

The trauma is re-experienced through combinations of persistent distressing thoughts, images, dreams, hallucinations or flashbacks. The victim can act or feel as if the trauma were recurring and feel intense psychological distress and/or physiological reactivity triggered by internal or

external cues that symbolise or resemble an aspect of the traumatic event (DSM-IV, 1994). In children, repetitive play may occur in which themes or aspects of the trauma are expressed.

1.2.1.4 Avoidance

Avoidance is another key feature. Symptoms include avoidance of thoughts, feelings, conversations, places, people or activities. Those suffering from PTSD may also feel detached and withdrawn from others and may be unable to experience the full range of emotions, this is termed emotional numbing. Some survivors suffer from a sense of a for-shortened future, they may not, for example, expect to have a career, marriage or a normal life span.

1.2.1.5 Arousal

Trauma victims show persistent symptoms of arousal which are expressed in terms of irritability, difficulty falling asleep, hypervigilance, concentration problems or an exaggerated startle response.

1.2.2.1 Differences Between DSM-IIIR & DSM-IV

DSM-IV differs from DSM-IIIR by increasing the emphasis on psychological distress. This is further endorsed by the inclusion an extra criterion, which emphasises that the disturbance must cause clinically significant distress or impairment in functioning. In addition, the original DSM-III (APA, 1980) criteria largely excluded RTA injury, whereas the DSM-IV offers a broader definition focused mainly on physical trauma (Andreasen, 1995). Support for a broad definition of trauma has been demonstrated by many authors. For example, Saigh (1991) found that PTSD in children could occur by at least four mechanisms; direct experience, observation, verbal mediation or through a combination of these. Importantly, he found that the level of

psychopathology did not differ significantly between PTSD cases traumatised via different mechanisms.

1.2.2.2 Criticisms of DSM-IV Criteria For PTSD

There are many criticisms of the DSM-IV, for example, it does not include all the symptoms reported clinically. In order to develop a clearer picture of the disorder it is necessary to examine the so called secondary features including survivor guilt or looking for the meaning of an event (Peterson, Prout and Schwarz, 1990, See Lifton, 1962). In addition, there is some evidence to suggest that the re-experiencing criterion is over-simplified. In particular, the term intrusive thoughts is inadequate in describing the phenomenology of acute cognitions and affective recollections (Atchison and McFarlane, 1996). Furthermore, there are a number of uncertainties with regard to the symptom criteria, particularly the treatment of numbing symptoms. It may well be that the numbing/re-experiencing symptoms should be separated from the phobic avoidance and perhaps from general anxiety symptoms (Mayou, 1996, Foa, Riggs and Gershuny, 1995).

1.2.2.3 Development of the DSM-IV Diagnosis in Children[1]

Post-traumatic stress reactions in adults have been recognised in the literature for many years (Foa, Steketee and Rothbaum, 1989; Trimble, 1985). In contrast, far less has been written about such reactions in children. Indeed, as late as 1985, some authors were arguing against the need for this diagnostic category in children (Garmezy and Rutter, 1985). These authors argued that, because the effects of trauma are relatively short lived, there was consequently no need for a specific diagnosis of PTSD. The view was contested by others (Yule and Williams, 1990, Yule,

[1] Where the term children is used, it refers to school aged children, aged up to 16 years.

1989, 1992) who pointed out that this assertion rested on information gathered from parent and carer behaviour rating scales and not on the children's subjective experience of trauma related intrusions, anxiety or cognitions. There was a growing body of evidence suggesting that adults either failed to recognise or denied the severity of these effects on children (Earls, Smith, Reich and Young, 1988, Galante and Foa, 1986, McFarlane, Policansky and Irwin, 1987, Yule and Williams, 1990). Indeed, Stallard and Law (1994), commenting on RTAs, suggest that 'parents often want to deny the severity of the incident and avoid talking about it in order to minimise the distress to the child'(p. 96). This in turn indicates to the child that the subject is taboo and must not be talked about.

In summary, there is increasing evidence which suggests that children and adults suffer similar post-traumatic stress reactions and that the assessment of PTSD in children should, as far as possible, be directed at their subjective experiences.

In 1987 the American Psychological Association (APA) recognised the diagnostic category of PTSD in children. Subsequently there have been two further revisions of the diagnostic criteria DSM-IIIR (APA, 1987) , and the DSM-IV (APA, 1994).

1.3 CHILDREN'S RESPONSES TO TRAUMA

1.3.1 Systematic Studies of Children's Responses To Trauma

Systematic studies of children's subjective reactions following exposure to traumatic events have provided much evidence to support the notion of PTSD in children. Studies have for example, examined children's psychological reactions to a fatal sniper attack on a school play ground

(Pynoos, Frederick, Nader, Arroyo, Steinberg, Eth, Nenez and Fairbanks, 1987), bush fires in Australia (McFarlane, 1987a, 1987b), terrorist attacks (e.g. Raviv and Klingman, 1983), hurricanes (Lonigan, Shannon, Taylor, Finch and Sallee, 1994) and hostage situations (Terr, 1979). In the light of these and other studies it is now accepted that school children and even pre-schoolers suffer with post-traumatic stress reactions which are very similar to those seen in aduits.

In terms of British research the most significant systematic studies of children's reactions to trauma are those conducted with survivors of the shipping disasters, the Jupiter and the Herald of Free Enterprise. This research will be summarised below.

1.3.2 Herald of Free Enterprise

In 1987 a roll-on-off car ferry, the Herald of Free Enterprise, capsized in Zeebrugge harbour. Yule and Williams (1990) were asked to assess the 22 children and their families who had survived this disaster. 13 of the 22 children were assessed at six-nine months. Over half the children were reported by their parents to be showing significant disturbance, whereas only two of them were rated by teachers were said to be disturbed. Yule and Williams concluded that the parent and teacher rating scales were not sensitive to the subjective distress caused by this trauma. Indeed, at interview, the children revealed much more pathology than was known to their parents or teachers. Yule and Williams (1990) subsequently gave these children the Impact of Events Scale (IES, Horowitz, Wilner and Alvarez, 1979). They discovered that children as young as eight years old found the scale meaningful and that the children's scores were higher than adult patients attending Horowitz's clinic for treatment. Re-assessed at 12-15 months, Williams and Yule found that IES scores had not dropped significantly.

More recently, research has supported the appropriateness of the IES for the assessment of post-traumatic stress reactions in adolescents (Yule, Bruggencate and Joseph, 1994). A principal component analysis of 334 adolescent survivors of the Jupiter sinking (see below) revealed a factor structure similar to that of adults who had survived this disaster.

1.4.3 The Jupiter

In 1988, the cruise ship Jupiter sank outside Athens harbour. On board was a party of 400 British school children aged between 14 and 16 years. Yule and Udwin (1991) offered to help survivors at one school and all 24 female survivors were screened on three scales: The IES (Horowitz et al., 1979), The Birleson Depression Inventory (BiDI; Birleson, 1981 Birleson, Hudson, Buchanan and Wolff, 1987), and the Revised Children's Manifest Anxiety Scale (R-CMAS; Reynolds and Richmond, 1978).On the basis of their scores 10 days after the sinking 10 girls were identified as being 'at risk' (Screen cut-offs; IES≥40, R-CMAS≥19, BiDI≥16). Without revealing which girls were 'at risk', Yule and Udwin offered help on an individual or group basis. Eight of these 10 'at risk' girls took up this offer, the other two attended the second treatment session. Yule and Udwin (1991) found a highly significant relationship between scores on the screening scales and later help seeking. They concluded that this battery of tests showed considerable promise in identifying the children who most needed help after a disaster.

Five months after the disaster, the Jupiter survivors completed the screening battery again. Their scores on the IES remained high, suggesting that they were still experiencing considerable unpleasant intrusive thoughts about the accident. In addition, their scores on both depression and anxiety measures had increased and were significantly higher than that of a control group. This

data was consistent with anecdotal descriptions of the psychological sequelae of disaster which suggests that survivors often experience a period of numbness and occasionally euphoria before the full impact of a disaster hits them (Yule and Udwin, 1991).

Yule and Williams (1990) and Yule and Udwin's (1991) seminal studies are important to RTA research for a number of reasons. For example, they emphasised the importance of measuring subjective distress. In addition, they developed a screening battery for identifying children who are at-risk of developing psychological difficulties. However, post-trauma symptoms that are evident in adolescents involved in major disasters may not have relevance to RTAs. The next section will argue that RTAs do indeed result in post-traumatic symptoms in some children and adolescents.

1.4 ROAD TRAFFIC ACCIDENTS

1.4.1 Psychological Consequences of RTAs in Adults

Mayou, Bryant and Duthie's (1993) comprehensive study of 181 adult RTA survivors found that at 12 months post-accident, approximately 25% of their sample reported psychiatric consequences of three overlapping types: mood disorder, PTSD and phobic anxiety about travel. For a fifth of subjects this anxiety was persistent and disabling. Thus, PTSD is one of a number of psychological consequences of RTAs (Mayou, 1996). Recently, Blanchard, Hickling, Taylor, Loos, Forneris and Jaccard (1996) investigated which adults developed PTSD following motor vehicle accidents. They found that 39% of their sample met the DSM III-R criteria for PTSD. Blanchard et al. (1996) found that degree of injury, previous experience of PTSD, whiplash injury, mood disorder and fear of dying in a motor vehicle accident predicted the development of

full PTSD. As recent studies (e.g. McFarlane 1987, Pynoos et al., 1987, Yule, Udwin and Murdoch, 1990, Lonigan, Shannon, Finch, Daugherty and Taylor, 1991) have suggested, there appears to be little to suggest that a sample of adolescents involved in RTAs might not show a similar level of traumatic symptoms.

1.4.2 Psychological Consequences of RTAs in Children

1.4.2.1 Single Case Studies

Jaworowski (1992) presents three case studies of children involved in RTAs as pedestrians. Although these vignettes were remarkable for their heterogeneity rather than their homogeneity, applying the DSM-IV criteria for PTSD to these vignettes offers a useful insight into the occurrence of post-trauma symptoms. For example, the re-experiencing symptoms were represented by repetitive dreams, and play centred on trauma themes and by demonstrating psychological distress to external cues (sirens). Avoidance and numbing were exemplified by social isolation, decreased confidence and in one case the expressions of omnipotence and invulnerability. Persistent increased arousal was shown by aggressiveness and outbursts of violent behaviour, difficulties maintaining attention and poor concentration. In addition, one child developed school refusal and another demonstrated a regression in toiletting behaviour. These case studies are instructive, but as Mayou (1996) suggests, it is important to avoid drawing general conclusions from them as case samples are usually highly selective.

1.4.2.2 Group Case Studies

Stallard and Law (1993, 1994) offer more clinical evidence to support the notion of PTSD symptomology in children following RTAs. Stallard and Law (1993) assessed and treated seven

of nine pupils who had been involved in a mini-bus accident while returning from an educational trip with their school. The mini-bus left a country road at speed, hit a tree in passing and rolled three times before coming to rest on its roof in a field. Luckily none of the group were seriously injured.

However, of the seven pupils assessed, all reported experiencing intrusive thoughts triggered by sounds, sights, and events associated with the event. Furthermore, all seven reported difficulty talking with their parents, extreme and persistent difficulties in concentrating at school, and all reported a heightened awareness of danger particularly with regard to travel in motor vehicles. Other symptoms included specific fears, sleep problems, difficulty talking with their peers and a sense of a foreshortened future. These difficulties had a profound impact on the pupils' social and family relationships and on leisure and school activities (Stallard and Law, 1994).

Curle and Williams (1996) studied the PTSD reactions among 25 adolescent children two years after a non-fatal coach crash in the Alps. Like Stallard and Law (1993), they used the screening measures used by Yule and Udwin (1991) to assess PTSD symptoms. They found that their sample showed good psychological adjustment when compared with the results from these other studies. They did, however, find significant gender differences, with the boys showing significantly lower levels of depression, anxiety and intrusive symptoms than the girls. This difference in self-reported distress is thought to reflect differences in socialisation, mediated by differences in coping strategies (Curle and Williams, 1996).

1.4.2.3 Controlled Studies

There has been little systematic research on children involved in RTAs which examine the prevalence of psychological symptoms. However, Canterbury, Yule and Glucksman (1993) compared children who had been victims of RTAs with a control group of children attending a hospital fracture clinic. The poor response rate for this study (33% RTA survivors, N=28, and 20% fracture clinic, N=24) makes generalisation difficult. However, this study remains as one of the few that has systematically collected data from accidents ranging in type and severity in children. Using Yule and Udwin's (1991) screening battery plus the Fear Survey Schedule-Revised (Ollendick, Yule and Ollier, 1991) they found no differences between group on measures of anxiety, depression or fears. They did, however, find higher IES scores in the RTA group. Canterbury et al. conclude that there is an emotional impact of a RTA over and above that associated with an accidental injury necessitating hospital attendance. However, the distress does not extend to higher levels of anxiety, depression or fears.

1.4.2.4 Treatment of PTSD in Child RTA Survivors

The seven pupils involved in Stallard and Law's study underwent two three hour group debriefing sessions and were assessed using the IES, R-CMAS and BiDI, both pre and post group. Stallard and Law (1993) found significant reductions in the IES intrusions subscale, depression and anxiety scales three months following their debriefing sessions. Importantly there were no significant differences between the mini-bus group and the scores of the Jupiter survivors. Without a non-treatment control group one cannot conclude that the debriefing alone had this effect. However, it does provide evidence to suggest that intervention following RTAs may have some long term beneficial psychological affects. In a review of research on

psychological debriefing, Bisson and Deahl (1993) conclude that, at least with adults, psychological debriefing at worst makes no difference and at best offers some protection against long term psychological difficulties. However, they point out, when protective factors are present (social support) and vulnerability factors are absent (previous psychological difficulties), any form of incident debriefing may be redundant. It may be helpful, therefore, to be able to identify 'at-risk' cases in order to target intervention and to minimise the risk of longer term psychological difficulties. Moreover, treatment should be based on theory which should offer an explanation of the constellation of symptoms that develop following trauma, as well as, offering predictions about treatment and research.

1.5 PTSD THEORIES

1.5.1 Psychological Theories of PTSD

Although there is a great deal of overlap between the many theories of PTSD, each theory makes a unique contribution to our understanding of the disorder and its treatment. These models include cognitive models, such as information processing (Horowitz, 1973; Foa and Kozak, 1986) or cognitive appraisal (i.e. Janoff-Bulman, 1985, 1992), psycho-social models (Green, Wilson and Lindy, 1985; Joesph, Williams and Yule, 1995), behavioural/learning theory models (e.g. Keane, Zimering, Caddell, 1985) and psychodynamic models (e.g. Freud, 1919).

Horowitz's (1973) and Janoff-Bulman's (1985, 1992) models have been highly influential in the development of the understanding of PTSD. They will, therefore, be reviewed before discussing Rachman's (1980, 1990) conceptualisation of 'emotional processing' on which the present study is based.

1.5.2 Horowitz's (1979) *Information Processing Model*

Horowitz's (1979) model of PTSD was perhaps the most influential early cognitive model and more recent models have been influenced by it (e.g. Creamer, Burgess and Pattison, 1992). Horowitz (1979) argues that traumatic events lie outside the realm of the everyday and, thus involve massive amounts of novel information.. This novel information, in the form of trauma related experiences, affect, thoughts and images cannot be integrated into the pre-existing cognitive structures, which are used to interpret or classify information. These cognitive structures overload and the individual is unable to process the trauma related information. This information remains in an active form and is shunted out of awareness through the joint processes of denial and numbing. However, the drive of this model is to process information and so the traumatic information surfaces into conscious awareness. This takes the form of "intrusions" such as nightmares, flashbacks and unwanted thoughts. As the active information returns, the system overloads and prompts responses of numbing and denial. According to this model, the individual oscillates between intrusion and denial-numbing before the information is fully processed.

Horowitz's model has tremendous heuristic value for both clinician and survivors. This model does, however, have a number of limitations. For example, it does not provide an adequate explanation of why some people develop PTSD and others, who having gone through a similar experience, do not. In addition, Horowitz does not offer explanations of how other factors such as social support interact with information processing (Power and Dalgleish, 1997).

1.5.3 Janoff-Bulman's (1985, 1992) *Cognitive Appraisal Model*

Cognitive appraisal models of PTSD offer some answers where Horowitz's model fails, although there is some degree of overlap between appraisal and information processing models. These models are similar in that they both suggest that individuals bring to a traumatic event pre-existing beliefs or models of the world and of themselves (Creamer, 1993; Power and Dalgleish, 1997). However, appraisal models are unique in that they seek to understand the meaning of the trauma for the survivor. One such model is that proposed by Janoff-Bulman, (1985). Her cognitive appraisal theory suggests that an overlapping set of basic assumptions are shattered by trauma. These basic assumptions included; a belief in personal invulnerability, a perception of the world as a meaningful and comprehensible place, and a view of the self in a positive light. PTSD is seen to result from the shattering of these assumptions and, the trauma victim is thought to develop antithetical assumptions. For example, the world is seen as hostile, unpredictable and chaotic. However, Janoff-Bulman's theory suggests that an individual's assumptions are shattered by trauma, this notion is difficult to support when one considers the evidence which suggests that individuals with pre-morbid psychiatric history are more likely to develop PTSD (e.g. Kilpatrick Veronen, Best, 1985). Such pre-morbid negative assumptions are unlikely to be shattered by trauma.

1.6 THEORETICAL BASIS THE PRESENT STUDY

1.6.1 Rachman's (1980) Emotional Processing Theory

Rachman's (1980) theory aims to provide an explanation for the symptoms following trauma, for individual differences in reactions and in the course of those reactions over time. Essentially,

Rachman suggests that there is a drive to process emotion so that it no longer intrudes or causes emotional disturbance. Although Rachman's theory has it's own limitations, it offers a framework within which pre-trauma personality is accounted and offers continuity between everyday and traumatic experiences. His theory will be outlined below.

Rachman's (1980) theory aims to link a variety of phenomena, such as reactions to disturbing events, nightmares and obsessions. According to Rachman, these are phenomena that can be regarded as indices of incomplete emotional processing. Rachman's theory provides a useful theoretical framework for understanding the psychological reactions of survivors. It is also pragmatic, in that it offers advice on how best to facilitate emotional processing in treatment.

Emotional processing is regarded as a process whereby emotional disturbances are absorbed and decline to the extent that other experiences and behaviour can proceed without disruption. Rachman suggests that it is easier to see failure in emotional processing than to see successful processing. Indices of satisfactory processing include a reduction in subjective distress and disturbed behaviour with a return to normal routine behaviours. In addition, individuals who have completed satisfactory emotional processing should, when reminded of their traumatic experience, not experience a disturbing emotional reaction.

According to Rachman, the 'central, indispensable index of unsatisfactory emotional processing is the persistence or return of intrusive emotional activity' (p.51). These include intrusive thoughts (Horowitz, 1975), disturbing dreams (Bandura, Adams and Beyer, 1977), and inappropriate expressions of emotion (Rachman, 1980). In addition, less direct signs of unsatisfactory emotional processing may include subjective distress, insomnia, an inability to concentrate,

irritability or excessive restlessness. Post-traumatic stress reactions are therefore seen as indicative of a process which is incomplete (Joesph, Williams and Yule, 1997).

Rachman suggests four factors which influence emotional processing, by either causing difficulties and thus making processing problematic, or by avoiding difficulties and resulting in the facilitation of emotional processing. These factors include stimulus, personality, state and associated activity factors. Factors causing difficulties include: uncontrollable, unpredictable, intense and dangerous stimuli (stimulus factors); high levels of neuroticism, introversion and a sense of incompetence (personality factors); high arousal, fatigue disturbed dreams (state factors); and the presence of concurrent stressors or the need to suppress the expression of emotion (associated activity factors). Conversely, if the stimuli are predictable, controllable, the person is high in self-efficacy, is in a relaxed state and increases their sense of control through associated activity, then they may avoid difficulties in emotional processing (Joesph et al., 1997). Rachman's theory (1980) offers little advice on the relative importance of one type of variable over another. Therefore it is difficult to say which of his stimulus factors, personality factors, state factors or associated activity factors might predict higher levels of PTSD symptoms. However, as Rachman's (1980) theory focuses on the processing aspects rather than the experience of the trauma, one may expect emotional processing variables to have more of an influence than accident variables (i.e. threat to life) on the level of PTSD symptoms.

The emotional processing model is able to account for 'everyday' and pathological emotional processing and appears to assume that there is one mechanism of emotional processing underlying both pathological and 'everyday' events. For example, intrusive phenomena are not limited to pathological disorders such as OCD or PTSD and it is now accepted that many adults

suffer from intrusive thoughts (Rachman and de Silva, 1978, Parkinson and Rachman, 1981 Salkovskis and Harrison, 1984). Recently Allsopp and Williams (1996) found that 85% of adolescents reported repetitive uninvited thoughts of some kind. They were interested in everyday intrusive experiences, for example, sudden creative ideas, resisted desires or persistent memories. Allsopp and Williams' study agreed with those conducted with adults by suggesting that discomfort (anxiety/depression), arising from intrusive phenomena, was related to the difficulty of dismissal but not with the type or frequency of intrusive thoughts. This finding is explained by Rachman's (1980) model, where difficulty of dismissal can be equated with the level of controllability of the stimulus factor, namely intrusive thoughts. Thus, lower levels of control will result in higher levels of emotional distress.

Allsopp and Williams (1996) performed a factor analysis on their data which suggested a factor reminiscent of Watson and Clarke's (1984) general construct of emotional distress. Watson and Clarke called this factor "negative affectivity". Allsopp and Williams (1996) suggest that "this factor might be susceptible to the impact of life events, traumatic episodes and mood disorders and may limit the habituation of intrusive phenomena" (p. 30). This suggests that adolescents who show difficulty dismissing intrusive thoughts in general might demonstrate difficulty in dismissing intrusive phenomena associated with traumatic life events such as RTAs. They propose a vulnerability to disorders such as PTSD in which the persistence of intrusive thoughts concerning a trauma could be explained in part by this pre-morbid vulnerability, which is a characteristic of the individual prior to trauma. This represents a valuable elaboration of Rachman's theory as this vulnerability would pose difficulties for the emotional processing of traumatic events and can be conceptualised as a 'cognitive style' which interacts with their accident related intrusive thoughts.

Intrusive phenomena form the core of the re-experiencing phenomena of the DSM-IV definition of PTSD and are the central feature of Rachman's theory. They are considered by some authors to be the hallmark symptom of the disorder (Calhoun and Resick, 1993, Foa, et al., 1989). As this research is concerned with measuring both everyday and accident related intrusive thoughts, they will be described in more detail and defined below.

1.6.2 Stimulus Factors; Intrusive Thoughts

Intrusive thoughts are considered intrusive because they are involuntary, unwanted phenomena that interfere with functioning and result in significant distress. They can emerge from the unconscious without any obvious trigger and can be experienced hours, days or even years after a traumatic event (Rachman, 1980, Ehlers and Steil, 1995, Parkinson, 1993). Distinguishing one kind of intrusive phenomena from another is difficult both clinically and empirically, as a result re-experiencing symptoms have generally been grouped together. This may be due to the fact that intrusive phenomenon are hypothesised to be markers of emotional processing of a traumatic event, the implication being that all types of intrusive phenomenon serve the same function (Horowitz, 1979). Matsakis (1994) argues that, although flashbacks and intrusive thoughts are both re-experiencing phenomena, there is a qualitative experiential difference between them. For example, flashbacks always include visual components and although individuals do not lose consciousness, they temporarily 'leave' the present and find themselves re-living their traumatic past. Intrusive thoughts are unwanted or unplanned thoughts or images of a traumatic event. It is these intrusive thoughts that are the focus of this research. They include recollections in the form of 'film clips', 'still pictures', 'sounds or smells', somatosensory sensations, thoughts or a feeling of repeating actions performed during the accident (Steil and Ehlers, in preparation).

1.6.3 Do Children Experience Intrusive Thoughts?

Recent research conducted with children suggests that they also experience intrusive phenomenon. For example, approximately three-quarters of adolescents in the "Jupiter" sinking and all nine pupils involved in a mini bus accident experienced recurrent, intrusive thoughts (Yule et al., 1990, Stallard and Law, 1993). This evidence again supports the notion that children's reactions to trauma are similar to adults. In the past some authors have suggested that traumatic symptoms may vary as a function of age (e.g. unlike adults children may not experience trauma related flashbacks, Eth and Pynoos, 1985, Terr, 1981). However, as children's subjective experience of trauma and trauma related intrusive phenomena is investigated this assertion seems less likely.

As well as being a key symptom of PTSD, intrusive thoughts are also prognostic. For example, for adults, Mayou et al. (1993) found that the strongest predictor of later PTSD was the report of frightening intrusive memories at the post-accident interview, a finding also reported by Stallard and Law (1993) in children. In addition, persistent intrusive memories have also been linked to poor long-term outcome and may be involved in maintaining the disorder (Ehlers and Steil, 1995). It is, therefore, important to understand their role in the development, maintenance and extinction of PTSD. As Baum, Cohen and Hall (1993) suggest intrusive memories can be seen as 'a primary mechanism by which the experience of a stress is extended beyond the presence of the stressor' (p. 282).

Although intrusive phenomena are central to Rachman's (1980) emotional processing theory, he does suggests other factors that may mediate PTSD symptoms. Rachman argues that successful

processing can be gauged from, amongst other factors, a person's ability to talk about their trauma. He notes that suppressing the appropriate emotional expression may inhibit processing (Freud, 1910). Several writers, for example, Raphael (1986), have noted that survivors often have the compelling need to talk about their experience. Anecdotal evidence suggests that being with or talking with others who have been involved in the same trauma was associated with feelings of well being (Curie and Williams, 1996). Thus, it is necessary to have the social support of people who will listen, provide emotional and practical support, who do not make the person feel worse and, in Rachman's terms, increase the controllability of their experience (Andrews and Brown, 1986).

1.6.4 Associated Activity Factors; Social Support

Social support has been suggested as an important variable which may mediate between trauma and PTSD symptoms (Solomon, 1986). Although the exact role of social support remains unclear, it is generally agreed that social support is important in the aetiology of PTSD (Jones and Barlow, 1990). Measuring social support focuses attention on the quality of the relationship the survivor has with their social system and the system's responses to them. This may be of particular importance with children, who generally exist within social worlds (predominantly school and home) typified by power imbalance. Together with the evidence that suggests that both teachers and parents may under-estimate the level of distress suffered by children following trauma (see Stallard and Law, 1994), it would seem sensible to have some assessment of their relationship with the broader social support system.

Joseph, Yule, Williams and Andrews (1993) suggested a basic distinction between perceived support and received support. Perceived support refers to the perception that support would be

available if required. Received support refers to the support actually received. Although some disaster researchers have tended to focus on perceived support (e.g. Cook and Bickman, 1990), others have argued that evaluating received support would be a more useful measure (Joseph, Andrews, Williams and Yule, 1992).

Working with adults, Joesph et al. (1992) found that received social support, as measured by the Crisis Support Scale, was strongly associated with lower scores on all measures of depression, anxiety and the intrusion subscale of the Impact of Events Scale (IES). Although their results were based on correlations, they concluded that crisis support is related to core PTSD symptoms (i.e. avoidance) as well as to over lapping depressive and anxiety symptoms. To date, very little work has been conducted with adolescents on the relationship between received crisis support and their resultant PTSD symptoms. This study hopes to explore this relationship.

1.7 OTHER FACTORS FOUND TO BE IMPORTANT IN THE PREDICTION OF PTSD

1.7.1 Factors Gleaned From Adult Research

Other risk factors for PTSD identified by adult research include, fear of dying in a RTA (Mayou et al., 1993, Blanchard et al., 1996), and the presence of a major depressive disorder prior to the RTA (Blanchard et al., 1996). However, Mayou et al. (1993) found that PTSD was not predicted by measures of neurotisim, previous psychological problems or baseline depression. This was not consistent with Blanchard et al.'s study. Evidence on the extent to how much injuries predict PTSD in RTA survivors is also mixed. Blanchard et al. (1996) found that degree of injury was one of four predictors of PTSD, a finding supported by Malt, Hoivik and Blikra's

(1993) study. However, Mayou et al., (1993) and Feinstein and Dolan, (1991) found no relation of injury to PTSD development.

1.7.2 Children & Adolescents

Little is known about the risk factors which make some children more vulnerable to developing PTSD than others (Udwin, 1993). Factors that have been suggested as being important include; the degree of exposure to the trauma (e.g. Pynoos et al., 1987), age, gender or race (Lonigan et al., 1991), parental reactions (McFarlane, 1987b), pre-existing psychiatric disorder (Earls et al., 1988) and academic ability (Yule and Udwin, 1991). Other factors that have not been systematically assessed in children include witnessing death or injury, being separated from family, subjective appraisals of life threat, degree of helplessness and subsequent survivor guilt (Udwin, 1993). With regard to RTAs, Jaworowski (1992) highlighted the contribution of pre-existing personality and behavioural characteristics to the development of post-trauma symptoms. For example, aggression, over-activity (Tarsh and Royston, 1985) and impulsivity (Thorson, 1975) have all been associated with accidental injury, including RTAs, in childhood.

It may be helpful to consider these factors within a developmental frame as the developmental task required of children at the time of exposure can be construed as concurrent stressors (Rachman, 1980, i.e. identity formation for adolescents, Erickson, 1963).

1.8.1 RATIONALE

According to Rachman (1980), intrusive phenomena are indicative of incomplete emotional processing, this applies to both everyday and traumatic experiences. This suggests that those individuals who do not experience everyday intrusive thoughts and those who do not experience

accident related intrusive thoughts will evidence lower levels of PTSD symptoms (Hypotheses 2a & 2b).

Rachman's theory also suggests that the same mechanisms are employed in everyday and trauma related emotional processing. These mechanisms can be conceptualised as enduring characteristics of the individual, or in Rachman's terms, personality factors. Therefore, how an individual deals with everyday intrusive phenomena (cognitive style) should be predictive of the extent of post-trauma symptoms (Hypothesis 3). For example, Rachman's theory suggests that greater controllability of accident related intrusive thoughts (stimulus factors) will result in lower levels of PTSD symptoms. Therefore, participants who experience everyday intrusive thoughts which are uncontrollable, will experience higher levels of PTSD symptoms. This study measured three aspects of controllability of intrusive thoughts; interference with behaviour, ease of dismissal and avoidance of situations that trigger them.

Everyday intrusive thoughts that are unpleasant or prompt feelings of guilt or worry are, according to Rachman (1980), symptomatic of unsatisfactory emotional processing. Thus participants who complain of unacceptable or unpleasant everyday intrusive thoughts may demonstrate unsatisfactory trauma related emotional processing, resulting in higher levels of PTSD symptoms. The frequency of intrusive phenomena is thought not to predict higher levels of PTSD symptoms because, as Rachman suggests, it is their unpredictability rather than their frequency which is important.

According to Rachman, the same processes underlie everyday and trauma related intrusion, therefore, hypothesis 3 will be repeated, focusing on accident related intrusive thoughts

(Hypothesis 4). However, trauma related intrusions are generally unpleasant and so this hypothesis focuses on the controllability and frequency of accident related intrusive thoughts and their relationship with PTSD symptoms.

Rachman also suggests other factors that mediate emotional processing, such as the level of support received following the trauma (associated activity factor, Hypothesis 5).

Rachman's theory (1980) offers little advice on the relative importance of one type of variable over another. However, as his theory focuses on the processing aspects of trauma rather than the experience of it, one might expect emotional processing variables to have more of an influence than accident variables (i.e. threat to life) on PTSD symptom level. Thus, this research aimed to investigate which factors (emotional processing factors vs. subjective and objective experience of accident factors) predicted higher levels of PTSD symptoms (Hypothesis 6).

1.9 AIMS AND HYPOTHESES

1.9.1 General Aims of Research

1. To survey an adolescent sample for the prevalence of PTSD symptoms following a road traffic accident.

2. To examine the relationship between PTSD symptoms and a number of variables, which have been suggested by Rachman's (1980) emotional processing theory and associated research, to be important in the development of PTSD. These relationships will be outlined in the specific hypotheses below.

1.9.2 Hypotheses

1. RTAs will result in some of the participants experiencing higher levels of PTSD symptoms than in the normal population.

2a. Those adolescents who experience everyday intrusive thoughts will evidence higher levels of PTSD symptoms (i.e. depression, arousal, anxiety, avoidance) than those who do not experience everyday intrusive thoughts.

2b. Those adolescents who experience accident related intrusive thoughts will evidence higher levels of PTSD symptoms (i.e. depression, arousal, anxiety, avoidance) than those who do not experience accident related intrusive thoughts.

3. Those adolescents who report everyday intrusive thoughts that are difficult to control (i.e. interfere with behaviour, are difficult to dismiss, prompt the participants to avoid situations which trigger them) or, that cause affective discomfort or are unacceptable to the subject will show significantly higher levels of PTSD symptoms. In addition, participants who experience more frequent accident related intrusive thoughts, will not show significantly higher levels of PTSD symptoms.

4. Those adolescents who report accident related intrusive thoughts that are difficult to control (i.e. interfere with behaviour, are difficult to dismiss, prompt the participants to avoid situations which trigger them) will show significantly higher levels of PTSD symptoms. In addition, participants who experience more frequent accident related intrusive thoughts, will not show significantly higher levels of PTSD symptoms.

5. Those adolescents who report lower levels of received crisis support or who talk about their intrusive thoughts (associated activity factors) will report higher levels of PTSD symptoms.

6. Emotional processing factors will predict more of the variance seen in PTSD symptoms than will subjective or objective accident factors.

2.0 METHOD

2.1 DESIGN

A single group survey design using standardised measures and a structured interview format.

2.2 PARTICIPANTS

Participants were drawn from the databases held by the Accident and Emergency (A&E) Departments of two large general hospitals. These departments collected standard information for their databases (i.e. date of birth, address, GP codes, etc.), information concerning injuries (i.e. where on body) and information about patient disposal (e.g. ward, home). Casualties are coded according to how and where their injuries were sustained, for example, codes for injuries sustained in the home, at school and on the road. All children between the ages of 11 and 15 years of age, who had been injured in a RTA in the last five months and who had not suffered a head injury, were selected from these data bases. Within these criteria, those adolescents who did not live locally to the hospital or who had incomplete database information (i.e. no GP, no addresses) were not selected. The poor response rate to the first mail-shot prompted the researcher to approach the second A&E department.

A RTA was defined as any accident that involved personal injury occurring on the public highway (including footways) in which a road vehicle (bicycle, bus, car, lorry, etc.,) or pedestrian was involved and which necessitated contact with the casualty department of a general hospital. Casualties may have been involved in RTAs as passengers, cyclists who had been hit by a car, cyclists who fell off their bicycles, road pedestrians and passengers in vehicles other than cars (e.g. buses).

2.3 MEASURES (Appendix 6.1.1-6)

2.3.1 Intrusive Thought Questionnaire (ITQ): Teenage Version

The ITQ was adapted and simplified from previously used instruments (Salkovskis, 1985) by Allsopp and Williams (1996). An initial question about the presence or absence of repeated uninvited thoughts was followed, for those answering positively, by nine questions tapping areas known from previous studies with adults to have an influence on their cognitive processing. The ITQ has been found to have a Cronbach's Alpha of 0.6601 (N=222; Williams, 1997).The questionnaire was shortened for this study to focus on intrusive thoughts. Those questions concerning magical thinking or neutralising were omitted.

Questions focused on the following:

1. the degree of interference;
2. the degree of affective discomfort caused;
3. the ease of dismissal;
4. avoidance of situations which trigger intrusions;
5. acceptability to the participant of experiencing these intrusions;

6. the recalled frequency of intrusions.

This research focused on these items for three reasons. First, a shorter version cut down on the number of items. Second, the study aimed to focus primarily on cognitive processes. Third, cognitive processes can be related to intrusive thoughts in general as well as trauma-related intrusive thoughts. Test-retest reliability for this measure has not been reported with this population and so test-re-test reliability were calculated for this measure. Intrusive thoughts were described to the participant with examples, they were then asked if they had experienced intrusive thoughts of this kind. If they answered positively they were asked to complete the remainder of the ITQ. The participants were told that the researcher was interested in non-accident related intrusive thoughts.

2.3.2 Intrusive Thought Questionnaire (ITQ-ACC): Teenage Version

This questionnaire has the same structure and items as the ITQ. However, in the ITQ-ACC the questions aim to investigate the participant's experience of accident related intrusive thoughts. For example, question one would read in ITQ "My uninvited thoughts" and in ITQ-ACC "My uninvited thoughts about the accident."

2.3.3 Revised Children's Manifest Anxiety Scale (R-CMAS)

The R-CMAS (Reynolds and Richmond, 1978) is a 37-item questionnaire designed to assess the presence or absence of a variety of anxiety related symptoms. Hodges (1990) suggests that the R-CMAS should not be used for diagnostic purposes, but supports its use as a screening measure or in assessing symptomology. It has been found to have high reliability (0.83-85, Reynolds and Richmond, 1978), moderate test-re-test reliability (Wisniewski, Mulick, Genshaft and Coury,

1987) and fair discriminant validity (Perrin and Last, 1992). Factor analyses suggests that it has three sub-classes of anxiety items - physiological, worry, and concentration - and a lie or social desirability measure (Reynolds and Paget, 1981).

2.3.4 Birleson Depression Inventory (BiDI)

The Depression Self-Rating Scale for Adolescents was published by Birleson (1981). He found that the BiDI could differentiate normal from depressed hospitalised adolescents and reported highly satisfactory test-re-test reliability and internal consistency. The BiDI was, until recently, the only British Scale for the assessment of depression in adolescents. Although originally an 18-item scale, Frith and Chaplin (1987) modified the scale to 16 items and confirmed its value as a screening instrument. However, compared to Birleson's (1981) sample, they found a wider range of scores in their normal sample. Birleson, Hudson, Buchan and Wolff (1987) have provided further evidence for the scale's utility in identifying depressed adolescents and excluding non-depressed adolescents.

2.3.5 Impact of Events Scale (IES)

This is a 15-item questionnaire developed by Horowitz, Wilner and Alvarez (1979) to measure the two most characteristic aspects of post-traumatic psychopathology, namely the strength of the unpleasant, intrusive thoughts (Intrusion Subscale, seven items) and the energy spent in trying to block them out of consciousness (Avoidance Subscale, eight items). Internal consistencies for the intrusion (0.88) and avoidance (0.89) subscales have been reported in adults (Zilberg, Weiss and Horowitz, 1982), and test-retest reliabilities range from 0.86-0.9. The IES has also been widely used with adolescents aged 8-16 years (Joseph et al., 1993, Yule and Williams 1990, Yule, Orlee and Murdoch, 1990). These studies confirmed that adolescents who had survived a sea

disaster found the questions meaningful and reported scores as high as those as traumatised adults. Yule et al. (1994) administered the IES to 334 adolescent survivors of the Jupiter cruise ship disaster to investigate its psychometric properties. They found a similar factor structure to that obtained with adults.

2.3.6 Crisis Support Questionnaire (CSQ)

This is a six-item self-report measure of received support which is anchored to the traumatic event. Respondents are asked to rate the support received from family and friends just after a traumatic event. The instrument is a retrospective measure of crisis support. Each question is rated on a seven point scale and higher scores indicate greater received crisis support (coding is reversed for item six). Internal reliability has been reported with survivors of the Jupiter disaster and found to be adequate (Joseph, Andrews, Williams, Yule, 1992). This questionnaire has not been used with adolescents in the past and so a test-re-test reliability check will also be carried out on this measure.

The IES, BiDI & R-CMAS have been used widely in the UK to measure adolescents' psychological reactions to trauma (Yule and Udwin, 1991). Together, these measures go to make up the post-traumatic stress disorder screening battery (Yule & Udwin, 1991) and using them ensures comparability with other British studies.

2.3.7 Structured Interview (Appendix 6.2)

The interview allowed the researcher to check the participants understanding of the instructions to the questionnaires, and their understanding of individual items and key concepts such as intrusive thoughts. The interview asked supplementary questions concerning injuries, type of

vehicles involved, vehicle speeds, vehicle damage and type of accident (e.g. head to head). The participant was also asked about others involved in the accident (i.e. others hurt, or killed), followed by questions concerning threat to life, feelings of helplessness and feeling scared during or immediately after the accident. The participants were also asked to rate a series of arousal symptoms taken from the Post-Traumatic Diagnostic Scale (Foa, 1996). This included irritability, difficulty concentrating and being overly alert. In addition, the length of time these symptoms had been experienced and the date of onset related to the accident was assessed.

If the participants agreed that they experienced accident related intrusive thoughts, they were asked if they had talked to anyone about these thoughts and, about how helpful this had been They were also asked about the type of intrusive thoughts they experienced (for example, as still pictures, film-clips, or smells). The final questionnaire (CSQ) was followed, for 19 of the participants, by questions concerning travel avoidance, changes in behaviour since the accident and particular fears that they had.

2.4 PROCEDURE

Following informal discussions, the Consultant in A&E at hospital 1 agreed in principle to support this research. A proposal was submitted to the Ethics of Research Committee serving this hospital and approval for the study was granted (Appendix 6.3). A second A&E department was also approached and approval was also granted from their Ethics of Research Committee (Appendix 6.4).

2.4.1 Recruitment

First, consent was sought from the consultants in A&E to allow the researcher to contact all

those adolescents involved in RTAs. Second, each participant's GP was approached via letter (Appendix 6.6). The GP was asked to complete and return a consent form and, if they deemed it appropriate, to send on an introductory letter, consent form and SAE to the participant's parents. After consulting with the Chairman of the Ethics of Research Committee, this process was modified after the first mail-shot for two reasons. First, there was a poor response rate and, second, the introductory letter was not felt to contain enough information about the study or about the participant's accident. To remedy this, a new letter was drafted with more detail about the participant's accident together with a question and answer sheet about the research (Appendix 6.6.1-3).

The databases were searched on two occasions in one hospital and a third search was performed at another hospital. This third search was undertaken because the response rate for the first two searches was poor. The third mailshot concentrated on RTAs involving motor vehicles as the percentage of adolescents initially interviewed who had suffered minor RTAs involving bicycles was high.

After receiving a consent form signed by both the participant and their parents, the parents were telephoned to arrange a time for interview. The interview took place at the participant's home and began with the researcher introducing themselves and the study. The participant's verbal consent was sought to confirm their willingness to participant before the interview began. Demographic data including age, gender and time since accident, obtained from the database was checked with the participant and their parent. Parents were not requested to remain in the room during the interview with the child, but were not discouraged if they wished to do so. The measures listed above were given within a structured interview format and were completed in the

manner dictated by their manuals or instructions.

The researcher administered the ITQ, the C-RMAS and the BiDI, in that order. These questionnaires measured intrusive thoughts, anxiety and depression respectively, without mentioning trauma. The participants then completed the IES, and were asked to provide a verbal account of their accident. Accident related intrusive thoughts were then assessed using the ITQ-ACC followed by the CSQ. The interview ended with a debriefing session to talk through any reactions the participant experienced while filling in the questionnaire or answering questions about their accident. The participants were asked directly if they were coping with their reactions to the accident, if they wanted further help or if they wished the researcher to talk with their parents.

Information about local services was made available to participants and their families if they were concerned, or if the results of their questionnaires suggested that they might require further help. Following the interview, all participants and their parents were given a full account of the research and of the relationship between intrusive thoughts and PTSD. Questions about the research were answered then. Nineteen participants were sent the CSQ and ITQ to calculate test-re-test reliabilities. All participants were sent, via their parents, a summary of the research findings.

2.4.2 Calculating The Composite Severity of Accident Score

The composite severity of accident was composed of the collision speeds of the vehicles or people involved in the accident and the severity of injuries received (Appendix 6.7.1). The speed of travel was coded in increments of 10 mph. (i.e. 0 = Stationary; 2 = walking/running; 3 = 5-15

mph; 4 = 15-25; etc.). The combined speed of both the participant and of those they collided with were calculated using this key.

To calculate the injury codes, descriptions of the accidents were transcribed and collated in one document. For each accident vignette, three independent raters were asked to assign an injury severity rating (1= minor, 2 = moderate and 3 = severe) using a key designed by the researcher (Appendix 6.7.1). In addition to % agreement, Cohen's Kappa was calculated as measures of inter-rater reliability for the assignment of injury severity codes.

Raters were also asked to assign each vignette with a global severity score (ranging from 1 to 10) considering all the information given (i.e. injuries, severity of the accident, psychological factors, etc,). These global ratings were then correlated with the composite accident severity score to provide a form of concurrent validity for the composite accident severity score. The results of these analyses are presented in the results section.

3.0 RESULTS

3.1 DESCRIPTIVE ANALYSIS

3.1.1 Response Rate

The A&E databases were searched on three occasions, twice in hospital 1 (mailshots 1 & 2) and once in hospital 2 (mailshot 3, see table 1). A total of 322 participants were identified from these databases and consent request forms were sent to their GPs. Of this number, 255 GPs agreed to consent, 9 forms were returned spoiled or incomplete and 58 consent forms were not returned. From this sub-sample of 255, 32 participants agreed to take part in this research, a response rate of 9.9%. Two participants not seen at A&E were included, they had been in RTAs but were not injured and were the siblings of other participants. As can be seen in Table 1, 36% of the 322 potential participants were female, a proportion that is also reflected in the DoT statistics (DoT, 1996). The DoT statistics suggests that between 16-38% of RTAs of all severities involve females.

Table 1: Response rates to three mailshots and grand totals.

Mailshot	Number in Mailshot	Male N (%)	Female N (%)	Number Agreed to Participate	Percentage of Sample Female	Response Rate (%)
1	162	102 (63)	60 (37)	14	42.9	8.6
2	132	90 (68)	42 (32)	16	26.3	12.12
3	28	15 (54)	13 (46)	2	50	7.1
Total	322	207 (64)	115 (36)	32 (+2)	35.3	9.9

3.1.2 Demographic Data

As Table 2 shows, the mean age of the participants was 13.2 years (*SD* =1.63; range = 10-16).

The mean age of females was 13 years (*SD* = 1.86; range = 10-16) and for males it was 13.37

years (*SD* = 1.53; range = 10-16). As can be seen in Table 2, four types of RTA were represented in this sample, 67.6% of these accidents involved a motor vehicle, and 32.4% of involved bicycles alone. Three participants were passengers on a bus, these were added into the passenger total. Participants were assessed between 38 and 302 days after their accident (M = 170; SD = 57.38). T-tests and chi-square tests revealed no significant differences between male or female participants on demographic measures. Compared with the total population from which the sample came, there appeared to be an over-representation of accidents involving bicycles and an under-representation of car passengers.

Table 2: Mean ages, accident type and time since accident by gender.

Number	Mean ages	Type of Road Traffic Accident (%)				Time Since Accident
(%)	Years (*SD*)	Passenger (%)	Cyclist knocked off bicycle (%)	Cyclist fell off bicycle (%)	Pedestrian (%)	Days (*SD*)
M 22 (65)	13.4 (1.53)	3 (30)	4 (80)	7 (63.6)	8 (100)	162 (59.75)
F 12 (35)	13 (1.89)	7 (70)	1 (20)	4 (36.4)	0 (0)	184 (52.17)
T 34	13.2 (1.63)	10 (29.4)	5 (14.7)	11 (32.4)	8 (23.5)	170 (57.38)
P %F (35)	---	12.5	9	60	17	---

M = Males; F= Females; T = Total; P = Percentage found in total sample (N = 322).

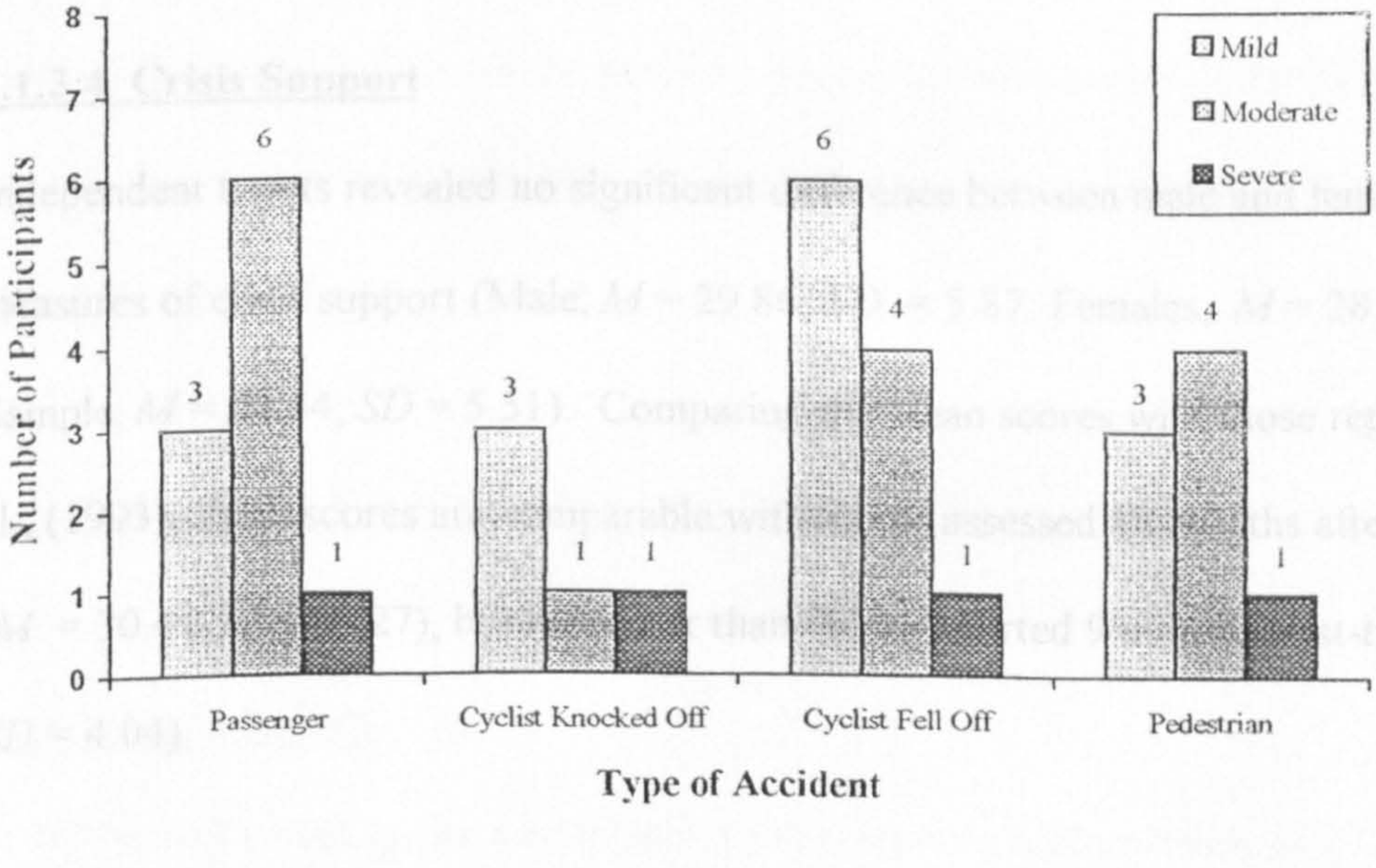
All participants were interviewed in their own home. Sixty-four percent were interviewed with a parent present, the remainder were interviewed within earshot of one or both parents. None of the sample reported reading or hearing difficulties.

3.1.3 Independent Measures; Accident Variables

3.1.3.1 Severity of Injury

Thirty-two of the 34 participants had been injured in a RTA. The severity of injuries varied from minor cuts and bruises to broken limbs and multiple injuries. A summary of severity of injury sustained in different types of RTAs is represented in Fig. 1 below. 12% of the sample suffered from severe injuries, 44% suffered from moderate and 44% suffered minor injuries.

Fig. 1; Number of participants who suffered mild, moderate or severe injuries by type of accident (N=34).



3.1.3.2 Collision Speeds

The median score of the participants' speed and the speed of the other vehicles or bicycles involved was 5-15 mph with ranges of 0-35 mph and 0-65 mph respectively. The median collision speeds of participants and others was 10-30 mph (Appendix 6.7.2.1).

3.1.3.3 Composite severity score

Injury ratings were summed with collision speeds to create the composite severity score. Due to the small sample size, the composite severity score was split using the median of 7. Those scoring ≥8 were designated the moderate to severe group ($N = 15$), those scoring 7 or below ($N = 19$) were designated the minor to moderate group. Independent t-tests were used to compare PTSD symptom measures between minor to moderate and moderate to severe accident severity groups (Appendix 6.7.2.2).

3.1.3.4 Crisis Support

Independent t-tests revealed no significant difference between male and female participants on measures of crisis support (Male; $M = 29.86$; $SD = 5.87$; Females; $M = 28.67$; $SD = 4.94$; Total Sample; $M = 29.44$; $SD = 5.51$). Comparing the mean scores with those reported by Joseph et al., (1993), these scores are comparable with adults assessed 18 months after a shipping disaster ($M = 30.41$; $SD = 5.27$), but are lower than those reported 9 months post-trauma ($M = 38.29$; $SD = 4.04$).

3.1.3.5 Everyday Intrusive Thoughts (ITQ)

Twenty-five participants reported experiencing 'everyday' intrusive thoughts. This small sub-sample meant that the scoring of the ITQ had to be modified from four or five response categories to two as the frequency of data entering some categories was low. Of those participants who reported everyday intrusive thoughts, 72% found these pleasant, 64% easy to dismiss, and 68% were not unduly concerned about having them. Sixty-four percent of participants reported that their everyday intrusive thoughts sometimes interfered with their

behaviour and 72% reported that they avoided situations that triggered these thoughts. Forty-eight percent experienced intrusive thoughts at least once a day or week. Of those children who reported having intrusive thoughts, 62% of them had not talked about their intrusive thoughts. Those who did talk about them reported that this was helpful (see Appendix 6.7.3.1 for detail).

3.1.3.6 Subjective Experience During and After the RTA.

All but two of the 34 participants had been injured in a RTA. None of these accidents resulted in a death. Fifty-two percent (*N*=18) felt helpless during the accident, 79.4% (*N*=27) were scared and 26.5% (*N*=9) reported that they felt their life was in danger. Following the RTA, 80% had changed their behaviour, with the majority becoming more aware of the dangers of the road. Twenty-five percent of participants reported avoiding using the mode of transport in which they had had their accident.

3.1.4. Dependent Variables: Measures of PTSD Symptoms

3.1.4.1 Hypothesis 1

1. RTAs will result in the participants experiencing higher levels of PTSD symptoms than in the normal population.

3.1.4.2 Anxiety, Depression, IES Total Score and Arousal. Comparisons with Normative Data

Although t-tests and chi-square tests revealed no significant differences between male or female participants on measures of PTSD symptoms, on virtually all measures the female participants scores were marginally higher than the male scores. Taking the sample as a whole and comparing

them with normative data, the sample's anxiety score (M = 12.94; SD = 6.33) was just below the values reported by Reynolds and Richmond (1978; M=13.84; SD = 5.79). The sample's scores for depression (M = 9.19; SD = 5.05) were above those reported by Firth and Chaplin (1987; M = 6.34; SD = 1.3) with 11 participants (32%) scoring at or above the cut-off for depression (≥12). The IES total scores (M = 18.97; SD = 15.89) lay within the band of moderate post-trauma symptomology (≥15; Horowitz et al., 1979). Fifty percent of the sample were within the minor, 21% moderate and 26% with the severe band for post-trauma psychopathology. Using Yule and Udwin's (1991) screening cut-off scores (IES≥40; R-CMAS≥19; BiDI≥16), nine participants fell within the 'at-risk' category, five of this group were male.

The arousal score could not be compared with normative data as this scale represented only part of Foa's (1996) post-traumatic stress diagnostic scale. Twenty-four participants began to experience arousal symptoms within six months of their accident. Sixteen participants (47%) had experienced their symptoms for more than three months, 11.8% between 1-3 months and 8.8% for less than three months. Eight participants did not report increased arousal related to the accident.

Table 3: Outcome Measures: anxiety, depression, arousal, IES avoidance, intrusion and total scores.

	N	R-CMAS Lie Scale	R-CMAS Anxiety	BiDI	Arousal	IES Avoidance Subscale	IES Intrusion Subscale	IES Total
Male	22	2.77 (2.39)	12.91 (6.98)	8.46 (4.94)	4.27 (4.24)	10.59 (9.14)	7.59 (8.46)	18.18 (16.62)
Female	12	2.50 (2.71)	13 (5.24)	9.92 (5.33)	4.583 (4.2)	12.92 (10.12)	7.50 (6.95)	20.42 (15.05)
Total	34	2.68 (2.47)	12.94 (6.33)	9.19 (5.05)	4.38 (0.71)	11.41 (9.41)	7.56 (7.85)	18.97 (15.89)

Key: R-CMAS = Revised-Children's Manifest Anxiety Scale; BiDI = Birleson Depression Inventory; IES = Impact of Events Scale. *SD* in brackets.

3.1.4.3 Anxiety, Depression and IES Total Score: Comparisons with other studies conducted with adolescents looking at PTSD following trauma.

Comparing the sample to previous research on adolescent RTA victims (i.e. Canterbury et al., 1993), the mean scores for depression and PTSD psychopathology were similar (see Table 4). The anxiety score is slightly higher for the present sample ($M = 12.94$; $SD = 6.33$) compared to Canterbury et al's findings ($M = 10.86$; $SD = 7$). However, comparing their findings to normative comparison data suggests that their sample's mean anxiety was below average, while the present study's mean anxiety score was average. Although this sample was highly selected, it did compare favourably with other research on adolescent RTA survivors. Compared to Curle and Williams' (1996) study two years on from a non-fatal coach crash in the Alps, the RTA survivors showed higher IES, depression and anxiety scores.

The IES total scores for the Jupiter sample was 35.33 (SD = 15.09) and was 31.00 (SD = 18.21) for the minibus sample reported by Stallard and Law (1993). This suggests that the adolescents involved in these studies suffered from considerably higher levels of PTSD psychopathology compared to adolescents involved in RTAs. The children involved in these studies also suffered higher levels of anxiety and depression.

Table 4: Screen ratings of Jupiter survivors at five months (Yule and Udwin, 1991), minibus survivors at six months (Stallard and Law, 1993), RTA survivors (Canterbury et al., 1993), coach crash survivors at two years (Curle and Williams, (1994) and data from this study.

	Cruise Survivors N=24		Minibus Accident N=7		RTAs N=28		Coach Accident N = 25		This Study RTAs N=34	
Measures	M	SD	M	SD	M	SD	M	SD	M	SD
IES	35.33	15.09	31.00	18.21	19.93	15.06	16.08	16.10	18.97	15.89
R-CMAS	16.04	7.53	13.57	5.75	10.86	7.00	8.72	6.39	12.94	6.33
BiDI	14.80	5.8	15.14	4.79	9.96	6.94	5.36	4.55	9.19	5.05

(Updated table from Canterbury et al. 1993, updated from Stallard and Law, 1993)

In summary, the sample's mean scores, compared to normative data, suggested that the sample was slightly more depressed, suffered with an average degree of anxiety and displayed moderate levels of PTSD symptoms. The sample's IES, anxiety and depression scores were similar to those reported in a group of RTA survivors, but were lower than those reported for more severe transport accidents. Approximately 26% of the sample fell in the 'at-risk' category. The data suggests that approximately half of the sample are suffering from moderate to severe levels of PTSD psychopathology as measured by the IES. This data provides some support for hypothesis 1.

3.1.4.4 Accident Related Intrusive Thoughts

Twenty-one participants (61.7%) reported having accident related intrusive thoughts. As with the ITQ, the ITQ-ACC had to be modified from four to five response categories to two (see section 3.1.3.5). Of those participants who reported accident related intrusive thoughts, most reported that they interfered with behaviour (77%), that they were unpleasant (90.5%), but did not feel unduly worried by them (76.2%). Approximately half the sample reported accident related intrusive thoughts that were difficult to dismiss (47.6%) and avoided situations which triggered them (52.4). Fifty-seven percent of this sub-sample reported intrusive thoughts that occurred once a day or once a week. Nine (24%) participants reported having upsetting dreams or nightmares about their accident, eight of this group reported dreams at least once a week (see Appendix 6.7.3.2 for detail).

3.1.5 Relationship Between Accident and Everyday Intrusive Thoughts

Comparisons could be made between the ITQ and the ITQ-ACC as they both measured identical cognitive processes. Non-parametric, matched pair comparisons were applied to this data revealing significant differences between the ITQ and ITQ-ACC.

The results suggest that accident related intrusive thoughts are significantly more unpleasant ($z = -2.94$; $p = 0.003$) and unacceptable ($z = -2.07$; $p = .04$) to the sufferer but occur less frequently than everyday intrusive thoughts ($z = -2.23$; $p = NS$). In addition, accident related intrusive thoughts are more prone to prompt the subject to avoid situations that trigger them ($z = -2.120$; $p = NS$). Conversely, there is no significant difference between accident and everyday intrusive thoughts on measures of interference with behaviour ($z = -0.632$; $p = .53$) and ease of dismissal ($z = -1.508$; $p = .13$).

3.1.6 Quality of Intrusive Thoughts

Twenty-one participants reported experiencing accident related intrusive thoughts. These results are similar to Steil and Ehler's (in preparation) findings with 159 adults who had experienced a RTA. Steil Ehler's percentage scores are given in brackets.

Of this group 71% (65) experienced them as film-clips, 66% (69) as still pictures, 66% (54) as repeating phrases or words, 52% (45) as thoughts, 52% (54) as somatosensory experiences, 48% (33) felt as if they were repeating actions, 43% (not reported) experienced the intrusions as a form of commentary on what happened, 33% (not reported) reported hearing intrusive sounds and 5% (not reported) reported intrusive smells..

3.1.7 Follow-ups

Of the 34 participants, three (8.8%) reported that they wanted further help. All three adolescents had already been referred to local psychological services by their GPs, but not for their reactions to their RTA. After consultation with the researcher's clinical supervisor, a letter was written to the participant's GP. In two cases, summaries of questionnaire data was sent, the third GP received a brief summary of the action taken by the researcher (i.e. provided participant with information about anxiety). Although 23.5% of parents were concerned about their child's reaction, 91.2% of the participants felt that they were coping with the psychological after-effects of their accident and required no further help.

3.2 PSYCHOMETRIC PROPERTIES OF MEASURES AND RATING SCALES

3.2.1 Test-Retest Reliability (See Appendix 6.8 for all re-test details)

Nineteen participants completed both the 'Everyday' Intrusive Thoughts Questionnaire (ITQ) and the Crisis Support Questionnaire (CSQ) for a second time between four and six weeks after the original assessment (response rate = 100%).

3.2.2 Tests of Normality

Kolmogorov-Smirnov Goodness of Fit tests were applied to those variables considered as ratio data. All were found to be normally distributed and were subject to parametric analysis. The Kolmogorov-Smirnov test was not applied to the intrusive thought questionnaires as its response format was considered categorical. Non-parametric statistics were applied to these and other categorical data.

3.2.3 'Everyday' Intrusive Thoughts Questionnaire (ITQ)

The percentage agreement between the first and the second administration (3-8 weeks later) on the ITQ was calculated. On measures of affective discomfort, ease of dismissal and avoidance, Cohen's Kappa ranged between .53 and .62. According to Landis and Koch (1977) this represents moderate to substantial agreement. Although percentage agreement was high for the items measuring acceptability to subject and presence of intrusive thoughts (75% and 76.9% respectively), the calculated Kappa was non-significant (.34 and .49 respectively). This is likely to be due to the unusual distribution of scores on these items. Percentage agreement for items measuring frequency and interference with behaviour was poor (31 and 46% respectively) and the calculated Kappa was non-significant (0.04 and 0.2 respectively). Thus, conclusions based on this questionnaire need to be treated with caution.

3.2.4 Crisis Support Questionnaire

Kolmogorov-Smirnov Goodness of Fit tests suggested that the items for the CSQ were normally distributed, and so a parametric pair-wise comparison was applied to assess test-retest reliability. The paired sample t-tests revealed no significant differences between test and retest scores. The total crisis support score demonstrated good test-retest reliability, and is the measure entered into the majority of the analyses in this research. Correlation coefficients for test-retest values ranged from .22-.77, with three items correlating significantly with one another (Item 1; $r = .69$; $p = 0.001$; Item 4; $r = .77$, $p = <0.0001$; Item 6, $r = .47$, $p = 0.0431$; Total score; $r = .6$ $p = 0.008$).

3.2.5 Inter-rater Reliability: Severity of Injury

Three independent raters were able to code the accident vignettes reliably using the coding system designed by the researcher. Mean percentage agreement between raters was

approximately 76.7% (*SD* = 3.78) with Kappa values ranging from moderate (.58) to substantial (.71).

3.2.6 Concurrent Validity: Global Severity and Composite Accident Severity Scales

Pearson correlations between these two scales were moderate to good, both between raters (r = .63-.74), and between the global ratings of accident severity and the calculated composite accident severity score (r = .67-.72).

3.3 HYPOTHESES 2 TO 6

3.3.1 General Consideration for analysis

The number of between group comparisons performed was high, which increased the chance of Type I errors. However, rigorous application of Bonferroni's adjustment would have increased the chances of Type II errors. Therefore, as a compromise, results significant at the <0.01 level will be reported, but only those significant at <0.001 levels will be judged truly significant. For hypotheses 2a to 5, independent t-tests were applied to the PTSD symptom scores using ITQ items to split the sample.

3.3.2 Hypothesis 2a. **Those adolescents who experience everyday intrusive thoughts will show higher levels of PTSD symptoms than those who do not experience everyday intrusive thoughts.**

There were no significant differences between participants who did and those who did not experience everyday intrusive thoughts on measures of depression, anxiety, arousal and PTSD

psychopathology[2]. However, an examination of the questionnaire means suggested that those participants who experienced everyday intrusive thoughts scored marginally higher on all measures of PTSD symptoms. (full table in appendix 6.9.1.1). For example, IES avoidance (t = 2.45; df = 32; p = 0.02) and IES total scores (t = 2.42; df = 32; p = 0.02) were higher for those who experienced intrusive thoughts. Therefore there is some evidence to support hypothesis 2a, however 50% of the sample reported both everyday and accident related intrusive thoughts which may elevate the level of PTSD symptom scores in this analysis.

3.3.3 Hypothesis: 2b. Those adolescents who experience intrusive thoughts about their accident will show higher levels of PTSD symptoms compared to those who do not experience accident related intrusive thoughts.

Those participants who experienced accident related intrusive thoughts reported significantly higher levels of arousal (t = 4.28; df = 32; p - 0.0002) and anxiety (t = 3.32; df = 32; p = 0.003), and higher levels of depression (t = 2.36; df = 32; p = 0.002) and IES avoidance scores (t = 2.05; df = 32; p = 0.04). IES intrusion score was also significantly higher (t = 4.12; df = 32; p = <0.001), which is unsurprising as the IES measures the strength of trauma related intrusive thoughts. The IES total scores for participants who experienced intrusive thoughts were also significantly higher (t = 3.3, df = 32; p = 0.003) and fell within the moderate severity range (*M* = 25.04; *SD* = 16.54). The mean scores for participants who did not experience them were within the non-pathological range (*M* = 9.15; *SD* = 8.3). These results offer some support to hypothesis 2b and to Rachman's (1980) emotional processing model (aee appendix 6.9.1.2).

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[2] The term PTSD psychopathology refers to the intrusion and avoidance subscales of the Impact of Events Scale. The term PTSD symptoms refers to all measures of PTSD, namely depression, anxiety, arousal and the Impact of Events total, and subscale scores.

Fisher's Exact test suggested that the number of people reporting accident related intrusive thoughts was no different for people who did or did not experience everyday intrusive thoughts (chi-sq = 2.84; Fisher's Exact p = 0.098). However, 50% of the sample reported both everyday and accident related intrusive thoughts. There appeared to be some relationship between these variables but the small sample size reduced the power of the Chi-squared test. 11.76% of the sample reported having no everyday intrusive thoughts but did, however, experience accident related intrusive thoughts. 17.6% did not experience everyday or accident related intrusive thoughts and 20% experience accident related intrusive thoughts alone.

3.3.4 Other Comparisons

Further between group comparisons on normally distributed data (e.g. time since accident, crisis support) revealed only one difference between those who did and those who did not experience accident related intrusive thoughts. The data suggested that younger adolescents experience less intrusive phenomena than older adolescents (t = 2.58; df =32; p = 0.014). Age was also found to correlate with the experience of accident related intrusive thoughts (r = -0.42; df = 32; p = 0.014). This suggests that as their age increased participants were more likely to report accident related intrusive thoughts. Age did not correlate with any other accident variable (i.e. injury, speeds) or symptom score. Furthermore, a Kruskal Wallis test revealed no significant differences in age between adolescents involved in different accidents (chi-sq = 3.96; p = 0.265; df = 3). However, age did correlate with time since accident, suggesting that as age increased, the length of time between accident and assessment also increased (r = .45; p = 0.007). Taken together, this data tentatively suggests that older adolescents experience more accident related intrusive thoughts, but it is unclear whether this is a developmental phenomena or merely an artefact in the data related to the length of time between accident and assessment.

3.3.5 Hypothesis 3 Those adolescents who report everyday intrusive thoughts that are difficult to control (i.e. interfere with behaviour, are difficult to dismiss, prompt the participants to avoid situations which trigger them), or that cause affective discomfort, or are unacceptable to the subject will show significantly higher levels of PTSD symptoms. In addition, participants who experience more frequent accident related intrusive thoughts, will not show significantly higher levels of PTSD symptoms.

Although few of the between group comparisons satisfied the adjusted probability, the general trend in the data offered some support for the hypothesis above. The mean scores for all PTSD symptoms were higher when intrusive thoughts were less controllable. As Table 5 shows, those participants who reported that their everyday intrusive thoughts interfered with their behaviour were significantly more likely to suffer from higher levels of arousal ($t = -2.83$; $df = 23$; $p = 0.009$). This was also true for participants who reported that they avoided some situations that triggered their everyday intrusive thoughts ($t = -2.69$; $df = 23$; $p = 0.009$). Those participants who reported that their intrusive thoughts were difficult to dismiss reported significantly higher levels of trauma related intrusions ($t = -4.54$; $df = 23$; $p = <0.001$) and generally higher levels of PTSD symptoms (For example, IES total; $df = 23$; $t = -3.17$; 0.001).

As with the variables measuring controllability, those participants who reported that everyday intrusive thoughts were unpleasant or resulted in feelings of worry or guilt (unacceptability) showed higher levels of PTSD symptoms (see mean scores in appendix 6.9.2.1-2). However, all but two variables failed to reach the adjusted probability (see Table 5). Those participants who reported that their everyday intrusive thoughts were unpleasant were found to have significantly

higher levels of trauma related intrusive thoughts (t = -3.27; df = 23; p = 0.003). In addition, those who were worried or concerned by their intrusive thoughts reported significantly higher levels of PTSD psychopathology as measured by the IES total score (t = -2.79; df = 23; p = 0.01).

Table 5: Examining PTSD symptom scores by ITQ items, interference with behaviour, ease of dismissal, avoidance, affective discomfort and acceptability to participant.

CONTROLLABILITY FACTORS							
PTSD Symptom Measures	Category		Mean	(SD)	df	t	p
i. Interference with Behaviour							
Arousal	Never Interferes Can Interfere	N=9 N=16	1.89 6.5	2.57 4.46	23	-2.83	0.009
ii. Ease of Dismissal							
IES Intrusion	Easy No Effort Easy Some Effort	N=16 N=9	5.38 17	5.06 7.65	23	-4.58	<0.0001
IES Total	Easy No Effort Easy Some Effort	N=16 N=9	15.81 36.33	11.5 16.06	23	-3.71	0.001
iii. Avoiding situations that trigger intrusive thoughts.							
Arousal	Never Avoids Avoids	N=7 N=18	1.286 6.22	1.25 4.47	23	-2.83	0.009
IES Intrusion	Never Avoids Avoids	N=7 N=18	2.86 12.17	2.97 8.19	23	-2.9	0.008
ASSOCIATED AFFECT							
Affective Discomfort							
IES Intrusion	Pleasant Unpleasant	N=7 N=18	6.72 16.86	6.44 8.23	23	-3.27	0.003
Acceptability to subject							
IES Total	OK to have them Not OK	N=17 N=8	17.65 35	13.43 16.68	23	-2.79	0.001

There were no significant differences between those participants who experienced everyday intrusive thoughts hourly or daily with those who experienced them weekly or monthly, on measures of PTSD symptoms (see Appendix 6.9.2.2). Support for this component of the hypothesis is weak as all mean symptom scores were higher in those participants who experience intrusive thought more frequently. This tentatively suggests that the frequency of everyday intrusive thoughts has some relationship with the manifestation of PTSD symptoms.

Mean IES total scores for participants who reported lower levels of control and higher levels of emotional discomfort were within the moderate to severe range of PTSD psychopathology (Horowitz et al., 1979). Conversely, higher levels of controllability and lower emotional discomfort were associated with non pathological to mild levels of PTSD psychopathology. In general these results tentatively support the hypothesis that everyday intrusive thoughts that are difficult to control or result in negative affect, are associated with higher levels of PTSD symptoms. Thus, mean PTSD symptom scores are higher when everyday intrusive thoughts: interfered with behaviour; caused affective discomfort; were difficult to dismiss; caused participants to avoid situations that triggered them or were unacceptable to the subject.

3.3.6 Hypothesis 4 Those adolescents who report accident related intrusive thoughts that are difficult to control (i.e. interfere with behaviour, are difficult to dismiss, prompt the participants to avoid situations which trigger them) will show significantly higher levels of PTSD symptoms. In addition, participants who experience more frequent accident related intrusive thoughts, will not show significantly higher levels of PTSD symptoms.

Of the 21 participants who entered the analysis, 90% reported accident related intrusive thoughts that were unpleasant and, 76% were not concerned about having them (N=16). The distribution of responses meant that applying independent t-tests to these items was inappropriate.

Participants who experienced accident related intrusive thoughts that were difficult to dismiss were significantly more likely to show higher scores on the IES avoidance subscale ($t = -4.99$; $p = <0.001$) and the IES total score ($t = -4.06$; $p = 0.001$). Furthermore, participants who

experienced more frequent accident related intrusive thoughts evidenced higher scores on the IES avoidance subscale (t = 3.37; p = 0.003) and the IES total scale (t = 3.20; p = 0.005). However, the number of days between accident and assessment was significantly ~~greater~~ lower (M = 155.67; SD = 52.55 vs. M = 217.57; SD = 36.71) for those participants who experienced more frequent accident related intrusive thoughts ((t = -3.0; p = 0.007). Thus, time since accident does appear to have an influence on the participants experience of accident related intrusive thoughts.

The general direction of scores for the ease of dismissal, acceptability to participant and frequency items are consistent with the data reported above (i.e. participants who reported accident related intrusive thoughts that were difficult to dismiss, caused them some degree of concern and that were more frequent, would result in higher levels of PTSD symptoms). However, the data did not show a consistent trend in mean scores, (e.g. interference with behaviour and avoidance items revealed no consistent direction) unlike the data for hypothesis 3 and there is a suggestion that time lapsed since accident has an influence on accident related intrusive thoughts. Thus there is only limited support for hypothesis 4 (see Appendix 6.9.3.1-3 for summary tables).

3.3.7 Hypothesis 5 Those adolescents who report lower levels of received crisis support or who do not talk about their intrusive thoughts (associated activity factors) will report higher levels of PTSD symptoms.

3.3.7.1 Crisis Support

The total score of the crisis support questionnaire did not correlate with any other variable with the exception of the depression score (r = -0.353; p = 0.04). This correlation suggested that, as

crisis support increased, depression scores decreased. Correlations between CSQ items and total depression score suggested that offers of practical help were associated with lower depression scores ($r = -.628$; $p = <0.001$). Two CSQ items were weakly correlated with IES total score. Higher IES scores were associated with lower levels of practical help ($r = -.373$; $p = 0.018$) and with higher levels of personal contact with others who have had similar traumatic experiences ($r = .409$; $p = 0.03$). These correlations offer only limited support for the hypothesis above.

Crisis support items were also correlated with other variables. For example, participants were less likely to report feeling helpless if they were offered practical help ($r = .-429$; $p = 0.004$) or if there was someone willing to listen to them after the accident ($r = 0.487$; $p = 0.013$). Interestingly, those adolescents who avoided situations that triggered their intrusive thoughts, were also less likely to be able to talk about their feelings after the accident ($t = 2.46$; $p = 0.02$).

3.3.7.2 Talking about accident related intrusive thoughts.

Independent t-tests found that the 24% of participants who had talked about their accident related intrusive thoughts had significantly higher IES total scores ($t = 4.04$; $p = <0.001$), IES intrusion scores ($t = 4.15$; $p = <0.001$) and IES avoidance scores ($t = 2.943$; $p = 0.006$). Differences in measures of depression and anxiety were not significant between groups (see Appendix 6.9.4 for a summary table). This data does not support the above hypothesis.

3.3.8 Hypothesis 6 Emotional processing factors will predict more of the variance seen in PTSD symptoms than will subjective or objective accident factors.

Stepwise multiple regression analyses were used to predict PTSD symptom scores. Although the number of variables entering the equation was high, the number of predictors was low (1-3) which satisfies the predictors to N ratio (see Howell, 1992). The Stepwise regression method also accommodates for the problem of multicollinearity.

3.3.8.1 Predicting PTSD Symptomology.

Six stepwise multiple regressions were applied to those variables thought to predict levels of PTSD symptoms. As stepwise multiple regression will only accept dichotomous categorical data, severity of injury, collision speed[3] and type of accident were converted into dichotomous variables for this analysis. The dependent variables included depression, anxiety, arousal, IES total and IES avoidance and intrusion subscales. The independent variables entered included injury (mild, moderate, severe), collision speeds (slow, moderate, fast), age, gender, accident type (pedestrian, bicycle knocked off, bicycle fell off, passenger), time since accident, six everyday intrusive thought items, crisis support total score and appraisals of life threat, and helplessness and fear experienced during the accident. A summary of these regression analyses appears in Table 6 below.

[3] Collision speeds where quoted in ranges. The middle point of the range was calculated and assigned to one of three categories. Collision speeds 0-15 mph = 1, 16-35 mph = 2 and >36 mph = 3. These were then coded in the usual way.

Table 6: Predicting PTSD symptoms with stepwise multiple regression analysis.

	Independent Variables Entered into Step Wise Multiple Regression equation that were significant.	**B**	**T**	**R^2**	**d.f.**	**F**
IES Total	Collision Speed (Fast)	34.229	6.55***	0.47	4,20	17.06***
	Collision Speed (Moderate)	15.74	3.56**	0.64		
	Severe Injury	-17.63	-3.145**	0.72		
	Affective Discomfort	9.08	2.09*	0.77		
IES Intrusion	Collision Speed (Fast)	12.46	6.72***	0.58	3,21	30.49***
	Affective Discomfort	6.23	3.5**	0.72		
	Frequency	-5.09	-3.32**	0.81		
IES Avoidance	Collision Speed (Slow)	-9.286	-2.66*	0.33	2,22	10.35**
	Threat to life	-9.33	-2.54*	0.48		
Arousal	Threat to life	-6.608	-4.29***	0.39	4,20	11.26***
	Interference with behaviour	3.55	3.04**	0.53		
	Accident Type (Fell Off Bike)	-3.69	-2.97**	0.61		
	Collision Speed (Fast)	-3.74	-2.269*	0.69		
Depression	Crisis Support	-0.46	-3.07**	0.25	2,22	8.153**
	Acceptability to Subject	4.62	2.57**	0.43		
Anxiety	Severity of Injury (Moderate)	7.16	3.39**	0.33	1,23	11.55**

*p<.05; **p<.01; ***p<.001.

The multiple regressions provided a summary of the variables that explained a significant proportion of the variance in PTSD symptoms. In all six regressions a number of variables did not add significantly to an explanation of PTSD symptom scores. These included age, time since accident, gender, experience of helplessness and fear during the accident, ease of dismissal and avoidance of trigger situations. Kolmogorov-Smirnov test applied to the unstandardised residual statistic of each regression revealed that the residuals were normally distributed.

1. **PTSD Total Score:** Of the 23 variables entered, four were found to significantly predict 77% of the variance for the IES total score. Fast collision speeds predicted 47% of the variance ($t = 6.55$; $p = <0.001$), moderate speeds added a further 17% ($t = 3.36$; $p = 0.02$), severe injury accounted for 8% of the variance ($t = -3.145$; $p = 0.005$) and the addition the ITQ item affective

discomfort, accounted for an extra 5% of the variance (t = 2.09; p = 0.04). The regression equation for predicting IES total scores is:

IES Total = -2.08 + 34.22 * High Speed + 15.74 * Medium Speed + -17.63 * Severe Injury + 9.08 * Affective Discomfort.

The regression equations for the following can be found in appendix 6.9.5.

2. **IES Intrusion Subscale:** Three variables accounted for 81% of the variance seen on this measure. These included: high collision speeds, (58%, t = 6.72; p = <0.001), affective discomfort (14%; t = 3.5; p = 0.002) and frequency of everyday intrusive thoughts (9%; t = -3.32; p = 0.003).

3. **IES Avoidance Subscale:** Low collision speeds were associated with the IES avoidance subscale accounting for 33% of the variance (t = 2.66; 0.015). The subjective experience of life threat was significantly associated with the avoidance subscale (t = -2.54; p = 0.019) and accounted for a further 15% of the variance seen on this measure.

4. **Arousal:** Life threat accounted for 39% of the variance (t = -4.29; p =<0.001), with an additional 14% accounted for by the inclusion of the ITQ item, interference with behaviour (t = 3.04; p = 0.006). Accident type (falling off bike) accounted for a further 12% (t = -2.97; p = 0.007) and fast collision speed accounted for the final 8% (t = -2.26; p = 0.034).

5. **Depression:** Crisis support was significantly related to depression scores (t = -3.07; p = 0.005) and accounted for 25.3% of the variance. A further 17.3% was accounted for by the degree of acceptability of having intrusive thoughts (t = 2.57; p = 0.017). Depression was correlated with acceptability to subject (r = 0.422; p = 0.035; N = 25), as depression scores increased, the unacceptability of intrusive thoughts increased.

6. **Anxiety:** Moderate severity of injury accounted for 33% of the variance seen on this measure ($t = 3.39$; $p = 0.02$).

In summary, collision speeds were involved in four out of the six regressions suggesting that objective features of the accident are important in predicting PTSD symptoms. Depression is unusual in that the equation excluded accident variables. Everyday intrusive thought questions were involved in four out of six equations, generally they supplemented other variables in the regression equations.

3.3.9.1 Correlation of ITQ items with each other and with other independent variables

Pearson Product Moment Correlations are moderate and so these results should be treated with caution. Of the six ITQ items, affective discomfort and frequency did not correlate with the other four ITQ items. In fact of the 15 possible correlations only three were significant. These included ease of dismissal with affective discomfort ($N = 25$; $r = 0.468$; $p = 0.05$), ease of dismissal with acceptability to subject ($N = 25$; $r=.557$; $p = 0.004$), and avoidance correlated with interference with behaviour ($N = 25$; $r = .460$; $p = 0.021$). Thus, as intrusive thoughts were increasingly difficult to dismiss, affective discomfort and unacceptability increased and, as intrusive thoughts increasingly interfered with behaviour, participants increasingly avoided situations that triggered them. ITQ items did not correlate with age, time since accident, crisis support or gender.

3.3.9.2 Correlation of independent variables with PTSD symptom measures

Age, time since accident and crisis support total score did not correlate with other variables. IES total and subscale scores were significantly correlated with fast collision speeds (IES total; r =

.62, p = <0.001; intrusion; r = .69, p =<0.0001; avoidance; r = .47, p = 0.005) and negatively with low collision speeds. Of the four types of RTA only one correlated with IES scores, namely passengers in cars (IES total; r = .49, p = 0.003; intrusion; r = .53, p =0.001; avoidance; r = .39, p = 0.026). Two subjective measures of the accident were significantly correlated with collision speeds. For example, threat to life was negatively correlated with fast speeds (r = -.35; p = 0.004) and positively correlated with slow speeds (r = .4; p = 0.0018). In addition, feeling helpless during an accident was positively correlated with slow speeds (r = .49; p = 0.005). Thus, as collision speeds increased, participants were more likely to report higher levels of PTSD psychopathology, and were more likely to feel helpless and feel that their life was in danger. In addition, mild injuries were correlated with slow collision speeds (r = .49; p = 0.004), but faster collision speeds did not correlate with more severe injuries.

3.3.9.3 Correlation of ITQ-ACC items with independent variables

Ease of dismissal of accident related intrusive thoughts was positively correlated with passenger RTAs (r = .82; p =<0.0001) and negatively correlated with cyclists falling off their bikes (r = -.60; p = 0.004). Thus participants who were involved in car accidents reported more difficulty dismissing intrusive thoughts than participants who had fallen off their bicycles. Taken together this tentatively suggests that those participants involved in more severe accidents report more difficulty in dismissing intrusive thoughts (assuming that an automobile accident is more serious than falling off a bicycle).

Interference of accident related intrusive thoughts correlated with gender (r = .56; p = 0.009). Of the 21 participants who experienced accident related intrusive thoughts, the seven females

reported that their intrusive thoughts never interfered with their behaviour. For male participants about half reported that accident related intrusive thoughts interfered with their behaviour.

3.4 ADDITIONAL ANALYSES

3.4.1 Subjective Experience of Accident

The multiple regression analyses and correlation data above highlighted the importance of the subjective experience of the accident for the sample. A closer examination of these differences appears below.

All measures of PTSD symptoms were higher for those participants who reported feeling scared, helpless or felt that their life was threatened during their accident. Those participants who felt that their life was in danger and felt helpless during their accident report significantly higher levels of arousal (see Table 7 below). Nearly 80% of the sample reported feeling scared during the accident, making a between group analysis meaningless. Fisher's exact tests suggests a significant relationship between the number of people who were deemed at-risk by Yule and Udwin's (1991) criteria and those who reported feeling helpless during an accident (Chi-sq = 5.88; Fisher's exact p = 0.018). Of those participants in the at-risk group, 89% reported feeling helpless during an accident. Other measures of the subjective experience of an accident were not found to relate with the at-risk group.

Table 7: Comparing PTSD symptoms for those participants who felt that their life was in danger or felt helpless during a RTA with those who did not feel their life was in danger or did not feel helpless.

LIFE THREAT			Mean	(SD)	df	t	p
Arousal	yes	N=9	8	3.77	32	3.87	0.001
	no	N=25	3	3.53			
HELPLESS							
Arousal	yes	N=18	6.33	4.52	32	3.18	0.003
	no	N=16	4.45	2.39			

*$p<.05$; **$p<.01$; ***$p<.001$; *ns* = non-significant

The mean scores on all symptom measures were higher for those participants who reported feeling helpless or that their life was in danger during an RTA. For example, the IES total scores for those participants who felt that their lives were in danger were within the moderate range of PTSD psychopathology compared to normative data. Those who did not feel that their life was in danger fell into the no pathology-mild pathology range.

3.4.2 Accident severity

The accident severity score was comprised of a severity of injury score and the combined speeds of vehicles or people involved in the accidents. Those participants who experienced a moderate-severe accident reported higher levels of IES intrusion ($t = -2.5$; $p = 0.021$) and IES total scores ($t = -2.14$; $p = 0.04$). Although these results did not reach the adjusted significance, taken with the data from the multiple regression analysis, 'objective' accident variables appeared to play some role in the prediction of PTSD symptoms.

4.0 DISCUSSION

4.1 Overview and general aims of research

There were two main aims to this study. The first was to survey an adolescent sample for the prevalence of PTSD symptoms following a road traffic accident. The second was to examine the relationship between PTSD symptoms and a number of variables which have been suggested by Rachman's (1980) emotional processing theory and associated research to be important in the development of PTSD. The discussion will begin with an overview of the research findings, followed by issues in methodology. The results will then be discussed in the light of previous research. The clinical implications of this research will be outlined followed by suggestions for future research. Finally, the conclusions from this study will be presented.

4.2 SUMMARY OF RESEARCH FINDINGS

This study found that just under 50% of those adolescents involved in relatively minor RTAs showed moderate to severe levels of PTSD psychopathology as measured by the Impact of Events Scale. Approximately a quarter of the sample fell within the 'at risk' category following Yule and Udwin's (1991) screening cut-off scores.

IES scores were similar to those reported by Canterbury et al., (1993) for adolescent RTA survivors but were considerably lower than those for children from the Jupiter disaster (Yule and Udwin, 1991) and for adolescents involved in a serious minibus accident (Stallard and Law, 1993). Mean depression and anxiety scores were average compared to normative data and other RTA studies but low compared to the Jupiter and minibus studies. Furthermore, over half of the adolescents reported having unpleasant intrusive thoughts about their accident.

Seventy percent of participants reported having everyday intrusive thoughts which is similar to the proportion reported by Allsopp and Williams (1996) in their study of everyday intrusive thoughts in adolescents. The majority of participants reported pleasant intrusive thoughts that were easy to dismiss. However, over 60% reported intrusive thoughts that interfered with their behaviour or prompted them to avoid situations that triggered them.

PTSD symptom scores were consistently higher for those participants who experienced everyday intrusive thoughts compared to those who did not experience them. Although these differences did not reach significance there was a trend in the data indicating that symptom scores were marginally higher on all measures.

Participants who experienced accident related intrusive thoughts scored significantly higher on measures of arousal, anxiety and IES total score. This data suggests that intrusive phenomena were associated with higher levels of PTSD psychopathology as symptom scores were significantly higher for those who experienced accident related intrusive thoughts

Participants who reported that they were more able to control their everyday intrusive thoughts showed generally lower levels of PTSD symptoms, as did those participants who reported that everyday intrusive thoughts were not associated with negative emotions.

The data also provided some support for Rachman's assertion that the cognitive style shown in the processing of everyday intrusive thought will be utilised when processing trauma related intrusive thoughts.

The picture was less clear when accident related intrusive thoughts were considered. Participants who reported accident related intrusive thoughts that were difficult to dismiss or that were frequent were significantly more likely to show higher levels of PTSD psychopathology. Ninety percent of participants reported experiencing unpleasant accident related intrusive thoughts, although three quarters were unconcerned about having them.

The data suggests that as accident related intrusive thoughts are inherently unpleasant, it is their frequency and uncontrollability that results in higher levels of PTSD symptomology. This partially supports Rachman's theory, which does not predict that more frequent accident related intrusive thoughts are associated with higher levels of PTSD symptoms.

Rachman suggests that associated activity factors such as social support will facilitate emotional processing. Thus, as crisis support increases, PTSD symptom scores should decrease. The study produced mixed results for the mediating influence of factors, such as crisis support, and talking about intrusive thoughts. Crisis support was correlated with depression scores, suggesting that higher levels of crisis support were associated with lower levels of depression. However, in this study, those participants who spoke about their intrusive thoughts generally showed higher levels of PTSD symptoms which is contrary to what Rachman's (1980) theory might have predicted.

The results from the stepwise multiple analyses suggested that the most consistent (and often the strongest) predictors of PTSD symptoms were objective and subjective aspects of the RTAs (i.e. collision speeds and threat to life). For example, collision speed and severity of injury predicted 72% of the variance in IES total score and collision speed and threat to life predicted 48% of the variance in IES avoidance scores. Cognitive style factors generally did not feature as primary

predictors but they did supplement the participants' experience of their accidents. They accounted for between nine and 17% of the variance in PTSD symptom scores.

4.3 METHODOLOGICAL ISSUES

4.3.1 Analysis

Many of the analyses were confounded or rendered uninterpretable by the small sample size. For example, Chi-squared tests were often meaningless as the number of counts in some cells were well below the expected value. In addition, the high ratio of predictor variables to sample size in the stepwise multiple regression analysis suggests that the results of this analysis should be treated with caution.

4.3.2 The Sample

As the sample size for this study was relatively small, conclusions drawn from the study should be treated with caution. In addition, the sample could not be considered as representative of the general RTA population making generalising the findings problematic.

Comparing the sample to the Department of Transport statistics (DoT, 1996) is problematic as this data does not include damage only accidents or accidents that are not recorded by the police. Therefore, comparing the sample to the A&E database population may be more helpful. This comparison indicates that there is an over-representation of accidents involving adolescents falling off bicycles and an under-representation of RTA passengers and pedestrians. Taken together, this suggests that the sample is comprised of relatively minor RTAs compared to the database population. However, injury severity can not be compared between these groups, so

one cannot be sure of accident severity. Furthermore, excluding participants who suffered head injuries considerably reduced the numbers included in the RTA population and introduced another level of bias.

4.3.3 Response Rate

The second major methodological concern relates to the poor response rate. As the reasons for non-participation were not assessed, one can only speculate on why 90% of families did not wish to participate in this study. This is a general problem for this type of research. For example Canterbury et al. (1993) reported a 33% response rate for a postal survey of adolescent RTA survivors.

This study and others (e.g. Blanchard et al., 1996) found that accident severity was predictive of PTSD psychopathology, suggesting that participants who are involved in more severe accidents suffer from higher levels of PTSD. Taken with the poor response rate for more serious accidents, it is possible that these families were experiencing higher levels of PTSD symptoms. With regard to more serious RTAs, Stallard and Law (1994) have suggested that parents may tend to minimise or deny their children's responses to RTAs, or if the parents were involved in the RTA, they may discourage discussion because of their own avoidance symptoms. For the adolescent, the pain involved in remembering or recounting aspects of a RTA may make them feel reluctant to discuss it. Furthermore, the emotional impact (i.e. blame or guilt) or legal concerns (i.e. litigation) of a RTA may well mitigate against participation in research.

In addition, the researcher's observation of the participants with their families suggested that generally, the participants came from supportive and caring families. The lack of any significant

differences in crisis support scores between participants suffering from higher levels of PTSD compared to those suffering from low levels may be due in part to a ceiling effect as the adolescent generally appeared to experienced good social support within their families. Taken with the poor response rate and the under-representation of more severe accidents, the sample was subjected to some unknown selection bias. Consequently, caution should be adopted when making generalisations to the wider adolescent population (Kalton, 1983).

4.3.4 Design

This study had a number of inherent flaws which should be considered when interpreting the results. First, it was not possible to measure everyday intrusive thoughts before the participant's accident and so this study relied on measuring everyday and accident related intrusive thoughts concurrently. According to Rachman (1980), everyday and accident related intrusive thoughts involve the same processes, therefore there is a theoretical relationship between these types of thoughts. However, the degree of overlap or interference between these two types of intrusive phenomena is unknown and so conclusions should be treated with caution. The design could have been improved by using a matched pairs design to provide some measure of control for the confounding effect mentioned above. Furthermore, if the sample size had been larger, the sample could have acted as its own control by comparing minor accidents with more severe accidents.

4.3.5 MEASURES

4.4.5.1 Test-Retest Reliability

The original questionnaires had been completed within a structured interview format allowing the participant to ask questions or to seek clarification on meaning. Thus, differences between test

and re-test results may be due to differences in testing conditions. Despite these difficulties, the test retest scores for the CSQ were good. However, this questionnaire's validity with adolescents is unknown and therefore caution should be taken when making interpretations. Importantly the language of the questionnaire posed no difficulties for the participants and all found the questionnaire quick and easy to complete.

The re-test of the ITQ produced less favourable results. Although percentage agreement for most items was about 75%, for items that measured frequency and interference with behaviour the percentage agreement scores were poor. Thus conclusion based on these items should be treated with caution. Rachman's (1980) theory suggests that the occurrence of intrusive thoughts depends on emotional processing. Life events that required emotional processing at the time of re-test may have influenced the participant's experience of intrusive thoughts, thus influencing ITQ scores.

4.4.5.2 Impact of Events Scale

The IES has been used with adolescents involved in RTAs and disasters (e.g. Stallard and Law, 1993, Canterbury et al. ,1993; Yule and Udwin, 1991). However, there are a number of limitations which should be considered in the interpretation of IES scores. For example, the IES is anchored to the experience of a specific stressful life event (Zilberg et al. 1982). In this study, some participants experienced very minor accidents which were not stressful by their own account. Others experienced relatively serious accidents along with serious injury and these participants may have reported frequent uninvited thoughts. However, as Ehlers and Steil, (1995) suggest, the occurrence of unwanted thoughts does not necessarily mean they are distressing. Thus it is possible for the participants in the examples above to produce identical

scores on the IES. The differences in subjective distress associated with the intrusive thoughts may be large however. Therefore, the IES, as a measure of PTSD psychopathology, has a number of limitations, particularly when applied across heterogeneous groups such as that found in this sample.

4.4.5.3 Depression and Anxiety Inventories

There is some evidence to suggest that the BiDI scores change with age. Firth and Chaplin (1987) found that children under 13 years of age scored significantly higher on the BiDI than older children. In this study, adolescents of all ages were grouped together and age effects were not taken into account. It is unclear therefore, what influence if any, the age of the child had on the results of the present study.

As with other research (e.g. Ollendick , Yule and Ollier, 1991), depression and anxiety scores were highly correlated. This has led some researchers to questions whether anxiety and depression are distinct constructs or, whether they are part of a more global category of emotional distress called 'negative affectivity' (Watson and Clarke, 1984). One implication of this is that there is little point in assessing both depression and anxiety at the same time (see Ollendick et al., 1991 for further discussion). Although depression and anxiety were highly correlated, they appeared to be associated with different aspects of the participant's traumatic experiences, a finding that is consistent with other studies (e.g. Ollendick, 1983).

4.4.5.4 Severity of Injury and Collision Speeds

The global accident ratings were highly correlated with the composite accident scores which offered some degree of concurrent validity. However, this study relied on self report to assess

severity of injuries and collision speeds. Other studies have used medical notes, injury rating scales and police and ambulance reports to verify accident data. (e.g. Mayou et al, 1991, Canterbury et al., 1993). The differences in findings between this and other studies may well be due to the method of assessment of accident severity rather than any actual differences in findings. Without an objective measurement of accident severity, the account given by the participant should be treated with caution.

4.4.6 PROCEDURE

A structured interview format was helpful for a number of reasons. From a practical point of view, contact with the participants enabled the researcher to cross validate the adolescents account of the accident with their parents. This was particularly helpful when assessing vehicle speeds. Contact also enabled the researcher to: describe concepts (i.e. intrusive thoughts); explain questionnaire items; assess the participants understanding of the concepts and items and ask supplementary questions if questionnaire scores were above average. The interview may have impacted on the response rate (a more invasive procedure) or on the response set of the questionnaires, either inflating scores or minimising them.

When asked to describe their accident, few of the participants appeared agitated and none appeared upset by this task. According to Rachman (1980), successful emotional processing can be gauged from a person's ability to talk about, or be reminded of the emotional events without experiencing distress. For all participants, one parent was within earshot, or in the same room, as they recounted their accident which may have inhibited their emotional response in some way. However, observations during interview and reactions to debrief questions suggested that three participants were upset when describing their accident. This suggests that the majority had

achieved satisfactory emotional processing. If this was true, then the measures of PTSD psychopathology were misleading.

4.4.7 PROCESS ISSUES

Process issues began with the introductory letter, information sheet and consent form that was sent to the participant's parents. These documents were signed by the researcher and three consultants. The formal tone of the letter and the number of professionals that were apparently involved may have been intimidating and thus affected the response rate. The information sheet was written for the parents, in hindsight a second information sheet written for the participant may have improved the response rate empowering the participant in the process of joining the research.

This research was set to ask adolescents about potentially life threatening and disturbing events. For example, it is possible that some participants had experienced the death of a loved one during an accident. A number of safe guards were built into the design to minimise the distress caused by this research. First, a series of steps to gain consent from the participant and their parent (see methods section). Second, a structured interview format which explained concepts of confidentiality, action that might be taken depending on the participant's results the participant's reactions were systematically checked as the interview progressed. Third, a debrief in which the researcher explained the research and PTSD symptoms. Finally, those participants who asked for further help were fully informed of the action the researcher would take. The interview generally took 30 minutes, but usually the researcher spent a further 15-20 minutes answering questions the family had or taking through their avenues for treatment.

4.5 INTERPRETATION OF RESEARCH FINDINGS

The level of PTSD symptoms found among this population of adolescents involved in RTAs was comparable to the findings of Canterbury et al. (1993). Compared to more severe trauma, however, the levels of PTSD symptoms are considerably lower. Stallard and Law (1993) note that the Jupiter disaster involved fatalities, and that the perceived probability of death was greater where actual loss of life had occurred. It is not surprising therefore, that the levels of PTSD symptoms, are lower in accidents that did not involve fatalities. There were no fatalities in the minibus accident reported by Stallard and Law (1993), but this accident was particularly severe, which may suggest that the severity of a RTA is an important variable in the prediction of PTSD symptoms. a proposition supported by this research. Furthermore, RTAs are what Green (1982) describes as 'peripheral' in the sense that the survivor's physical setting and social supports remain intact. Therefore, even significant trauma may not result in PTSD if protective factors, such as social support, are in place.

Only eight percent of the sample required further help. This stands in stark contrast to the 26% suggested by Yule and Udwin's (1991) screening scores. It suggests that these screening scores may not be appropriate for adolescents involved in less serious trauma such as RTAs. Stallard and Law (1993) encountered similar circumstances. They found that four out of seven adolescents were identified by the screening scores and only one these required further help. This is noteworthy as their sample reported higher levels of PTSD psychopathology than general RTA samples. All three of the adolescents in this study who required further help had also been referred prior to their assessment, as was the child in Stallard and Law's study. These observations offer anecdotal support for evidence from adult research which suggests that

psychological problems before a RTA are thought to increase the vulnerability to the development of PTSD (e.g. Blanchard et al, 1996).

The presence of accident related intrusive thoughts tended to predict levels of PTSD symptoms. A finding which offered some support for the hypotheses developed from Rachman's (1980) theory. In keeping with Rachman's ideas, intrusive thoughts may provide an indirect indicator of emotional distress which can be tracked and assessed throughout treatment. However, as Horowitz (1979) suggests, the expression of PTSD symptoms follows a phasic/oscillating course and timing of assessment will affect what symptoms are found. Therefore, using intrusive thoughts as an indicator of treatment progress may not be as useful as Rachman's theory suggests.

The study also found some support for the influence of cognitive style variables on PTSD symptoms. In particular, participants who experienced everyday intrusive thoughts that were difficult to control or were emotionally disturbing reported significantly higher levels of PTSD symptoms. This finding agreed with Allsopp and Williams' (1996) suggestion of a pre-morbid vulnerability to the impact of life events. Interestingly, the degree of dismissability and interference with behaviour did not differ between everyday and accident related intrusive thoughts. These two 'cognitive style' variables remained unchanged irrespective of the type of intrusion, which tentatively suggests that they may be rate limiting variables in the processing of traumatic experiences. Alternatively, they could also be artefacts of the method of measurement. This supports the notion of continuity that Rachman (1980) posits between everyday and trauma related intrusive thoughts. These 'cognitive style' variables are also measures of controllability.

High controllability is postulated by Rachman to be an important indicator of successful emotional processing.

According to Rachman, (1980) crisis support should mediate the emotional processing of trauma. In this study, crisis support total score was found to correlate with depression, a finding which supports Rachman's theory and is also supported by other studies on adults (e.g. Joseph et al, 1992). Indeed, multiple regression analysis found crisis support to predict 25% of the variance seen in depression scores, a finding which is supported by work with adults from the 'Herald of Free Enterprise.' (Joseph, Dalgleish, Thrasher and Yule, 1995).

The relationship between depression and crisis support is unclear, however, crisis support and other post-trauma variables (life events since disaster) have been found to be more predictive of emotional reactions, such as depression and anxiety, while exposure variables (i.e. degree of helplessness) have been found to correlate strongly with intrusive thinking (Joseph, Yule, Williams and Hodgkinson, 1994). Thus, depression scores for RTA survivors may be indicative of the quality social support they receive post-trauma. However, in this study measures of the degree of helplessness were seen to decrease with increasing crisis support.

The results of the multiple regression analysis suggested that objective and subjective measures of a RTA predict PTSD symptoms more strongly than emotional processing variables such as those hinted at by Rachman (1980). Seventy-two percent of the variance seen in IES scores was predicted by fast collision speeds and by severe injuries. Raphael (1986) notes that the major aetiological factor in the development of post-traumatic response is the intensity of the traumatic event. The degree of exposure to a traumatic event has been found consistently to predict PTSD

symptoms in children. For example, Pynoos et al. (1987) found that children who were in the highest exposure group during a sniper attack (in the school playground), subsequently developed higher levels of PTSD symptoms than children who were not at school on the day. Thus, if speed and injury equate with severity of an accident then it is not surprising that PTSD psychopathology increases as the 'intensity' of the accident increases. However, high speed may also be equated with decreased perception of controllability, which is a principle feature of many theories of PTSD (i.e. Janoff-Bulman, 1985, Foa, Zinbarg and Rothbaum, 1992, Rachman, 1980).

Collision speeds also predicted 58% and 33% of the variance seen in the IES intrusion score and avoidance scores respectively. Longitudinal data collected on fire-fighters by MacFarlane (1992) found that avoidance as measured by the IES, had no relationship with the onset of PTSD symptoms. Rather it acted as a defensive strategy employed to contain the distress generated by intrusive phenomena. Thus, intrusive thoughts are thought to be a primary symptom of PTSD while avoidance is a secondary response to intrusive phenomena. This study found collision speeds predicted more of the variance in intrusion scores than avoidance scores, which tentatively supports MacFarlane's findings.

Collisions speeds are supplemented by cognitive style variables in the prediction of the IES intrusion subscale, the affective discomfort associated with everyday intrusive thoughts predicts a further 14% of the variance after collision speeds. This tentatively suggests that after severity of accident, cognitive processing variables are influential in the prediction of intrusive phenomena.

The avoidance subscale's primary predictor is collision speeds followed by perceived threat to life during the RTA. Fear of dying was found by Mayou et al. (1993) and Blanchard et al. (1996) to

predict PTSD in adult RTA survivors. It is not surprising therefore, that this variable is significantly associated with PTSD symptomology. What is unclear is the relationship between threat to life and avoidance and which other factors account for the 52% of the variance not explained by these variables. Rachman's theory has little to offer in terms of explaining which variables of the trauma predict higher levels of PTSD symptoms. Janoff-Bulman's (1985) theory offer some explanation. She proposed that assumption regarding personal invulnerability is clearly challenged by life threatening experiences. The survivor will act to protect their assumptive world (that they are not vulnerable) by avoiding situations, feelings or thoughts which challenge this view. Therefore, it is not surprising that after severity of accident variables, subjective experience of threat to life predict avoidance.

A similar explanation can be levied at the arousal variable as threat to life is also found to predict 39% of the variance. Here, cognitive processes might mediate between threat to life and arousal symptoms in a similar way to cognitive conceptualisations of panic disorder (Clark, 1986)

What is clear from the above multiple regression analyses is that measures of accident severity (collision speeds, injury) are generally found to be the primary predictors of PTSD symptoms. They account for between 34-68% of the variance seen in anxiety and IES total and subscale scores. After these variables, a substantial contribution is also made by cognitive variables, such as threat to life. Cognitive style variables are also seen to make significant contributions to the variance, but they are generally found to supplement other variables.

4.6 CLINICAL IMPLICATIONS

This research has confirmed the importance of accident severity and threat to life as predictors of PTSD symptoms. In addition it has highlighted other variables that may be important in the

development, maintenance and treatment of PTSD. Accident related intrusive thoughts have been found to be indicative of generally higher levels of psychological distress. This finding is helpful for two reasons. First, intrusive thoughts may offer an indirect indication of the psychological adjustment of an individual to their trauma. This may be particularly helpful with adolescents who may deny psychological difficulties or find it difficult to talk about their traumatic experiences. Second, tracking intrusive thought through treatment may offer a good method of evaluating the efficacy of an intervention.

This research also suggested that some assessment of a survivors everyday cognitive style with regard to intrusive phenomena may be helpful. Cognitive style variables which are found to be important include the controllability and affective discomfort caused by intrusive phenomena. These factors may be construed as vulnerability factors in a formulation of the patient's post-traumatic reaction. In addition, challenging the under lying assumptions concerning intrusive thoughts may well facilitate recovery (e.g. I cannot control these thoughts, therefore I am loosing my mind). The relationship between everyday and accident related intrusive thoughts might provide the survivor with reassurance by construing the accident related intrusive thoughts as more powerful versions of everyday phenomena, rather than being conceptualised as a pathological process.

At present psychological support is rarely offered to adolescents involved in RTAs. Assuming that an intervention is required, treatment would generally take the form of psychological debriefing (PD). PD is a structured intervention designed to promote emotional processing of traumatic events through the ventilation and normalisation of reactions (Bisson and Deahl, 1994). Some support for the efficacy of PD with adolescents has been provided by Stallard and Law

(1993). However Yule and Udwin (1991) found that PD did not significantly reduce the number of unpleasant and intrusive thoughts experienced. This study suggests that attention should be paid to the idiosyncratic nature of PTSD symptoms. With regard to intrusive thoughts, the present study has suggested that cognitive style variables may influence the manifestation of PTSD symptoms and thus an assessment of their influence may be helpful.

Studies conducted on adolescent help seeking behaviour suggests that even if a problem is reported to cause considerable distress, only half will ask for help for that problem (Boldero and Fallon, 1995). This suggest that screening adolescents involved in RTAs or at least providing them with information may be helpful. A large part of PTSD treatment involves helping the survivor to make sense of their experience (Matsakis, 1994). Giving information can be helpful in a number of ways. For example, it helps survivors to realise that their experiences are typical of many involved in similar events, normalising the experience of their symptoms. Mayou et al. (1993) suggested that providing RTA survivors with information about possible psychological reaction to RTAs may serve some preventative function. Furthermore, it may be important to educate parents and teachers about the possible psychological and emotional consequences of RTAs on adolescents. This may prevent the mis-attribution of post-trauma symptoms, such as irritability and difficulty concentrating with normal adolescent behaviour. Some of the findings from this study (i.e. the proportion of adolescents who find their accident related intrusive thoughts disturbing), may be the sort of information that survivors and their families might find helpful.

In terms of the legal implications, Jaworowski (1992) notes that clinicians are continuing to assess the consequences of accidental injuries for litigation and compensation without having

access to the basic information. For example, the incidence and type of psychiatric consequences in a general population of patients admitted to hospital following accidental trauma. Systematic studies of RTA survivors such as this, create a much needed reference for clinicians when trying to assess RTA survivors for both clinical and legal reasons. However, the poor response rate and bias sample should be considered when making these comparisons.

4.8 FUTURE RESEARCH

This research supports the claim that adolescents suffer PTSD symptoms following RTAs. However, at present there is a lack of systematic research in this area. A central issue for future research concerns improving response rates. This and other studies have been highly selected therefore, there is still a great need for basic survey research based on large representative samples. Contact with the research should ideally begin when the survivor is seen at the A&E department, this may take the form of an information sheet suggesting future contact. Thus, the research is identified with the department and may be seen as part of its everyday operation and concerns. The ethical issues involved in such research should be discussed in full and should guide the development of research designs.

This research has also suggested other more specific directions for future projects. Some of these are outlined below.

1. The screening scores developed by Yule and Udwin (1991) do not provide an adequate screen for adolescent RTA survivors. The results from this study and from Stallard and Law (1993) suggest that the Yule and Udwin's screening scores produce a large number of false positives.

Longitudinal research directed at charting the adjustment of adolescents to their RTA may help to refine this screen or suggest other protective or risk factors that predict adjustment.

2. The number of adolescents involved in RTAs suggests that screening each survivor for PTSD may be an inefficient method of targeting those at risk of developing post trauma difficulties. Providing information for RTA survivors may serve a prophylactic function. A control trial to examine the effect of receiving information on the development of PTSD symptoms in RTA survivors may provide some answers to this question.

3. This research highlighted the importance of cognitive variables in the prediction of PTSD symptoms. It did not, however, assess the interpretations that adolescents make about their intrusive thoughts. These interpretations are thought to mediate between the intrusive thoughts and their subsequent symptoms (Ehlers and Steil, 1995). Thus, it may be helpful if future research assessed adolescents interpretations of their intrusive experiences.

4. The finding that older adolescents report more accident related intrusive thoughts may be just an artefact of the data. However, it may suggest that the experience of intrusive thoughts is related to cognitive development and in particular the development of meta-cognitive ability. Meta-cognitions is the term used to describe self-knowledge about cognitive processes or 'thinking about thinking' (Brown 1978, Wells 1994). This work need not be carried out with trauma victims, but rather focus on everyday intrusive phenomena and their development.

5. In general the research lacks a typology of intrusive phenomenon. It is assumed that all intrusive thought serve the same function and are caused by similar mechanisms. Joseph,

Williams and Yule, (1995) have suggested two types of intrusive phenomena, one characterised by flashbacks the other by ruminative behaviour. A typology of this sort would provide the researcher with more defined concepts with which to investigate the role of intrusive thoughts in PTSD symptoms.

4.9 CONCLUSIONS

1. A quarter of all adolescents involved in RTAs were found to suffer severe levels of PTSD psychopathology as measured by the IES. Mean scores for the group as a whole were similar to levels of PTSD symptoms reported by Canterbury et al. (1993). 26% were recognised by Yule and Udwin's (1991) screening score to be at-risk of developing further problems.

2. The experience of accident related intrusive thoughts was associated with higher levels of PTSD symptoms.

3. Everyday intrusive thoughts that were controllable and did not cause affective discomfort were associated with lower levels of PTSD symptoms following a RTA.

4. Post-traumatic symptoms were predicted by accident severity variables such as collision speeds and degree of injury. Cognitive style variables were found to supplement accident severity variables.

5. These findings need to be replicated with a larger sample to include other variables that were not measured by this research.

Rachman suggests that intrusive phenomena are indicators of emotional processing. The findings above tend to support this prediction. In general symptom scores were higher in participants who experienced everyday or accident related intrusive thoughts. In addition, Rachman suggests that the degree of controllability of everyday intrusive thoughts should be associated with PTSD

symptoms. Support for this hypothesis was also provided by this research as high levels of control were associated with lower symptom scores. Rachman's theory does not suggest which factors are more important in the development and maintenance of PTSD symptoms. However, one might expect cognitive style variables to predict most of the variance seen in symptom scores. The research found only weak support for this notion, as in general, symptom scores were predicted by accident severity measures and threat to life during the accident. In summary, this research provides some support for Rachman's theory, however, the theory is unable to accommodate for accident related factors such as severity of accident and threat to life.

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APPENDICES

Code Number.....

ITQ: TEENAGE VERSION

Do you ever have 'intrusive thoughts', that is thoughts which repeatedly come into your mind even though you have not invited them?

Yes ☐ No ☐

From each one of the following groups pick **ONE ANSWER** that best describes the thoughts that have come into your mind even though you have not invited them. When you have chosen **put a tick in the box** next to your answer and go on to the next group of sentences. Answer ALL the questions.

1. My uninvited thoughts

a. Never stop me from doing other things I want to do ☐
b. Stop me a little and waste a little of my time ☐
c. Stop me from doing other things and wastes some of my time ☐
d. Stop me from doing lots of things and waste a lot of time ☐

2. The feelings I get when I have my uninvited thoughts are

a. Pleasant ☐
b. A little pleasant ☐
c. Quite unpleasant ☐
d. Very unpleasant ☐

3. To get rid of my uninvited thoughts is

a. Easy without any effort ☐
b. Easy with some effort ☐
c. Sometimes difficult even with effort ☐
d. Usually impossible ☐

4. I avoid situations which trigger off my uninvited thoughts

a. Never ☐
b. Sometimes ☐
c. Often ☐
d. Always ☐

5. When I have my uninvited thoughts I feel

a. It's OK to have them ☐
b. A little worried or guilty about having them ☐
c. Quite worried or guilty about having them ☐
d. Very worried of guilty about having them ☐

6. On average I have thoughts which come into my mind even though they are not invited

a. At least once every hour ☐
b. At least once everyday ☐
c. At least once every week ☐
d. At least once every month ☐
e. Less than once a month ☐

Code Number.....

ITQ II: TEENAGE VERSION

Do you ever have 'intrusive thoughts', that is thoughts about the accident which come into your mind even though you have not invited them?

Yes ☐ No ☐

From each one of the following groups pick **ONE ANSWER** that best describes the thoughts that have come into your mind even though you have not invited them. When you have chosen **put a tick in the box** next to your answer and go on to the next group of sentences. Answer ALL the questions.

1. My uninvited thoughts about the accident

a. Never stop me from doing other things I want to do ☐
b. Stop me a little and waste a little of my time ☐
c. Stop me from doing other things and wastes some of my time ☐
d. Stop me from doing lots of things and waste a lot of time ☐

2. The feelings I get when I have my uninvited thoughts about the accident are

a. Pleasant ☐
b. A little pleasant ☐
c. Quite unpleasant ☐
d. Very unpleasant ☐

3. To get rid of my uninvited thoughts about the accident is

a. Easy without any effort ☐
b. Easy with some effort ☐
c. Sometimes difficult even with effort ☐
d. Usually impossible ☐

4. I avoid situations which trigger off my uninvited thoughts about the accident

a. Never ☐
b. Sometimes ☐
c. Often ☐
d. Always ☐

5. When I have my uninvited thoughts about the accident I feel

a. It's OK to have them ☐
b. A little worried or guilty about having them ☐
c. Quite worried or guilty about having them ☐
d. Very worried of guilty about having them ☐

6. On average I have thoughts about the accident which come into my mind even though they are not invited

a. At least once every hour ☐
b. At least once everyday ☐
c. At least once every week ☐
d. At least once every month ☐
e. Less than once a month ☐

Appendix: 6.1.3 Revived Children's Manifest Anxiety Scale

Code Number.....

What I Think And Feel

Instructions. Please answer as honestly as you can. The statements refer to how you think and feel. Please tick the box which best describes the way you think and feel. Please remember, there are no right or wrong answers.
Thank you.

	Yes	No
1. I have trouble making up my mind.		
2. I get nervous when things do not go the right way for me.		
3. Others seem to do things easier than I can.		
4. I like everyone I know.		
5. Often I have trouble getting my breath.		
6. I worry a lot of the time.		
7. I am afraid of a lot of things.		
8. I am always kind.		
9. I get mad easily.		
10. I worry about what my parents will say to me.		
11. I feel that others do not like the way I do things		
12. I always have good manners.		
13. It is hard for me to get to sleep at night.		
14. I worry about what other people think about me.		
15. I feel alone even when there are people with me.		
16. I am always good.		
17. Often I feel sick in my stomach.		
18. My feelings get hurt easily.		
19. My hands feel sweaty.		
20. I am always nice to everyone.		
21. I am tired a lot.		
22. I worry about what is going to happen.		
23. Other children are happier than I.		
24. I tell the truth every single time.		
25. I have bad dreams.		
26. My feelings get hurt easily when I am fussed at.		
27. I feel someone will tell me I do things the wrong way.		
28. I never get angry.		
29. I wake up scared some of the time.		
30. I worry when I go to bed at night.		
31. It is hard for me to keep my mind on my school work.		
32. I never say things I shouldn't.		
33. I wiggle in my seat a lot.		
34. I am nervous.		
35. A lot of people are against me.		
36. I never lie.		
37. I often worry about something bad happening to me.		

ALL INFORMATION WILL BE CONFIDENTIAL

Appendix: 6.1.4 Birleson Depression Inventory

Code Number.....

Birleson Depression Inventory

Instructions. Please tick the box which best describes how you have felt over the last week. Please answer as honestly as you can. There are no right or wrong answers, it is important to say how you felt over *the past week*. Thank you.

	Most	Sometimes	Never
1. I look forward to things as much as I used to			
2. I sleep very well			
3. I feel like crying			
4. I like to go out			
5. I get tummy aches			
6. I enjoy my food			
7. I can stick up for myself			
8. I think life isn't worth living			
9. I am good at things I do			
10. I enjoy the things I do as much as I used to			
11. I like talking with my family			
12. I have horrible dreams			
13. I feel very lonely			
14. I am easily cheered up			
15. I feel so sad I can hardly bear it			
16. I feel very bored			

ALL INFORMATION WILL BE CONFIDENTIAL

1065 105

REVISED IMPACT OF EVENTS SCALE **On _____ you experienced _____**

Instructions: Below is a list of comments made by people after stressful life events. Please tick each item indicating how frequently these comments were true for you during the past seven days. If they did not occur during that time please mark the "not at all" column.

	Frequency			
	Not at all	**Rarely**	**Sometimes**	**Often**
1. I thought about it when I didn't mean to.				
2. I avoided getting myself upset when I thought about it or was reminded.				
3. I tried to remove it from memory.				
4. I had trouble falling asleep or staying asleep because of pictures of thoughts about it that came into my mind.				
5. I had waves of strong feelings about it.				
6. I had dreams about it.				
7. I stayed away from reminders of it.				
8. I felt as if it hadn't happened or wasn't real.				
9. I tried not to talk about it.				
10. Pictures about it popped into my head.				
11. Other things kept making me think about it.				
12. I was aware that I had a lot of feelings about it, but I didn't deal with them.				
13. I tried not to think about it.				
14. Any reminders brought back feelings about it.				
15. My feelings about it were kind of numb.				

ALL INFORMATION WILL BE CONFIDENTIAL

Code Number.....

CRISIS SUPPORT SCALE

We would like to ask you a few questions about your family and friends, the people you have turned to for help, advice, and support since the accident. Each question asks about the support you received just after the accident. That is, in the three months following the accident. Each answer has seven answers ranging from Never to Always. As a guide, think of these words as representing the numbers below.

Never	Very Seldom	Seldom	Sometimes	Often	Very Often	Always
1	2	3	4	5	6	7

Now thinking about the people you have turned to for help, advice, and support

	Never					Always
1. Whenever you wanted to talk how often was there someone willing to listen after the accident?	1	2	3	4	5	6
2. Did you have personal contact with others people with a similar experience just after the accident?	1	2	3	4	5	6 7
3. Were you able to talk about your thoughts and feelings just after the accident?	1	2	3	4	5	6 7
4. Were people supportive and sympathetic just after the accident?	1	2	3	4	5	6 7
5. Were people helpful in a practical sort of way just after the accident?	1	2	3	4	5	6 7
6. Did people you expected to feel supportive make you feel worse at any time after the accident?	1	2	3	4	5	6 7

ALL INFORMATION WILL BE CONFIDENTIAL

STRUCTURED INTERVIEW

Code Number .....

DATE .....

THINGS I NEEDS WITH ME:

	Tick
Set of questionnaires	☐
Pencils/Pens	☐
Clipboard	☐

Perception

How is your reading? OK/POOR/CAN'T READ

Do you need glasses to read? NO/YES.....If Yes: Ask to get them.

Can you hear me OK? YES/NO.....IF No: What can I do that would help?

GET THIS INFO FROM REFERRAL LETTER

AGE	**.....yrs.**
GENDER	**M.....F**

PREAMBLE: *READ SLOWLY!*

My name is Kevin Meares and I am trying to understand how best to help people like you after a road accident. I am not a doctor, I am someone who tries to help those people who are upset by what they think, feel or do.

Today I want to spent 45 minutes with you. Some of this time you will spend filling in questionnaires, some of this time will be spend answering questions. Please remember there are no right or wrong answers to any of the questions. If you want to stop at any point then just tell me and we will stop. At the end of our time together, if you have any questions then I will answer them then. Is that OK? Do you have any questions that you would like to ask now?

Please remember that the information you give will be confidential. This means that the answers to your questionnaires and the things I write down during this interview are labelled with a code number. Your name does not appear on any of these documents. Information will be reported as group data and individuals cannot be identified. Please remember there are no right or wrong answers to these questions.

Are parents/guardian present? Yes/No

READ Are you happy to go on? **Yes/No**

READ OK we're going to start by filling in some questionnaires.

NOTE: IF THE PARTICIPANT GIVES AN ACCIDENT RELATED THOUGHT TELL THEM THAT THEY ARE ON THE RIGHT TRACK. BUT ASK THEM IF THEY HAVE THOUGHTS WHICH INTRUDE WHICH ARE NOT ABOUT THE ACCIDENT.

READ The first questionnaire relates to uninvited thoughts. Uninvited thoughts are thoughts that just pop into your head. For example, sudden creative ideas, sudden worries, memories of a person, etc..,.

READ Do you understand what I mean?

Yes.....No.....Sort Of

If No/Sort Of:

READ When I am writing a letter, or doing some work, or watching the telly, I might suddenly think about something completely out of the blue. Its almost as if the thought came from nowhere.

READ Do you understand what I mean?

Yes.....No.....Sort Of

If still No then miss out ITQ-I. Score them as never having intrusive thoughts.

GIVE ITQ-I

R-CMAS

READ The second questionnaire is about how you think and feel. The instructions are written on the questionnaire, I'll read them through with you so you can understand them.

GIVE R-CMAS

READ **Please answer as honestly as you can. The statements refer to how <u>you</u> think and feel. Please <u>tick the box</u> which best describes the way you think and feel. Please remember, there are no right or wrong answers.**

READ have written on

The third questionnaire is about how happy or unhappy you been feeling over the last week of so. The instructions are the questionnaire, I'll read them through with you so you can understand them.

GIVE BDI

READ

Please tick the box which best describes how you have felt over the last week. Please answer as honestly as you can. There are no right or wrong answers, it is important to say how you felt over *the past week*. Thank you.

ABOUT THE ACCIDENT

READ

Now we are going to spend some time talking about the accident you were involved in. Sometimes talking about these things can make us feel uncomfortable or even scared. If you feel like you don't want to go on then please say stop and we can finish. You do not have to answer any of these questions, so if you feel unhappy, scared or just 'not right' then we will stop.

READ Is that clear?

Yes.....No

READ Are you happy to keep going?

Yes.....No

Give IES

READ Below is a list of comments made by people after stressful life events. Please tick each item indicating how frequently these comments were true for you during the past seven days. If they did not occur during that time please mark the "not at all" column.

ABOUT YOUR ACCIDENT: Could you tell me what happened?_____

_____

_____

Extent of Injuries?

_____

_____

Mode of transport:

Car	Bicycle	On Foot	Skateboard

What hit you?

Car	Motorbike	Lorry	Bus

How fast were you going? **KMPH.....MPH**

DK	wkg	5-15	15-25	25-35	35-45	45-55	55-65
65-75		75-85	85-95	95-105	105-115	115-125	125+

How fast were they going? ? **KMPH.....MPH**

DK	wkg	5-15	15-25	25-35	35-45	45-55	55-65
65-75		75-85	85-95	95-105	105-115	115-125	125+

Could the vehicle you were travelling in be used after the accident?

Yes.....No.....DK

Type of Accident (vehicle the participant ws driving in appears first).

Head On	Side to Side	Head to side	Side to Head	Rear to Head
Head to Rear				

READ Now I will ask you some questions about your accident. Please just answer yes or no to the questions.

	YES	NO
Were you hurt?		
Was someone else hurt?		
Was anyone killed?		
Did you think that your life was in danger?		
Did you feel helpless?		
Did you feel scared?		

Parents?

Show participant sheet number 1

Arousal Symptoms: ***IN THE LAST MONTH***

Use the following key.

0	1	2	3
Not at all or only one time	Once a week/once in a while.	2-4 times a week/half the time.	5 or more times a week/ almost always.

	Score
Have you had trouble falling asleep or staying asleep?	
Have you been feeling irritable or angry?	
Had trouble concentrating? (loosing track of a story, drifting in and out of conversations?	
Have you been overly alert? (For example, checking to see who is around you)	
Have you been jumpy or easily startled? (For example, when someone walks up behind you).	
If participant answered yes to any of the above questions;	

Having upsetting dreams or nightmares about the accident? (details?)	

DO NOT USE SHEET 1 FOR THE BELOW!

How long have you experienced the problems that you reported above?	Tick
Less than one month	
1-3 months	
More than 3 months	

How long after your accident did these problems begin?	
1. Less than six months	
2. 6 or more months.	

READ Now we are going to spend some time thinking about the thoughts you have about your accident. Thoughts or images of the accident that just pop into your head.

Hand participant ITQ2

READ Have you ever talked to anyone about your unwanted thoughts?

Yes-------No

READ How helpful was this?

Very Helpful Helpful Not Very Helpful Very Unhelpful

PROCEED ONLY IF PARTICIPANT HAS INTRUSIVE THOUGHTS ABOUT THE ACCIDENT. IF THEY DO NOT HAVE INTRUSIVE THOUGHTS THEN GOT TO 'CRISIS'.

READ **How do you experience tour intrusive thoughts. Please answer yes or no to the following questions.**

Are your intrusive thoughts;

Circle the answer they give.

As if you remember yourself talking about the accident to others? Yes....No

Like a film scene that you see in your mind? Yes....No

Like one or more snapshots, or still pictures? Yes....No

As if you hear sounds again that you heard then? Yes....No

As if you smell again what you smelled then? Yes....No

As if you go over in your mind what you or other people said then? Yes....No

As if you are writing a diary or as if you tell your self what happened? Yes....No

As if you think again what you thought then? Yes....No

As is you experience bodily sensations that you had then? Yes....No

As if you do again what you did then? Yes....No

READ Now we are going to spend some time talking about the support you received since your accident.

HAND PARTICIPANT CSQ

READ We would like to ask you a few questions about your family and friends, the people you have turned to for help, advice, and support since the accident. Each question asks about the support you received just after the accident. That is, in the three months following the accident. Each answer has seven answers ranging from Never to Always. As a guide, think of these words as representing the numbers below.

Do you think that you are coping with your thoughts and feelings about the accident?

Yes....No.....Yes/No

Have you been avoiding travelling by car/bike/bus since your accident? **Y/N**

What are you doing differently now? .....
.....
.....
.....
.....
.....

Is there anything in particular you are scared of?.....
.....
.....
.....

READ **We have now finished the interview and questionnaires.**

DE-BRIEF: Sometimes people feel nervous or up-set when they talk about things that are difficult.

Did the questionnaire make you think about anything in particular?
What was good/bad?, etc..,
Do you have any questions that you would like to ask me?

READ SLOWLY! Are your parents concerned about your reactions to the accident?

Yes.....No.....DK.....Maybe

READ SLOWLY! Would you like me to talk to them?

Yes.....No.....DK.....Maybe

READ SLOWLY! Do you think you need any help to deal with your reactions to the accident?

Yes.....No.....DK.....Maybe

What's going to happen now.
I'm going to score your questionnaires. If you are interested I will send you a brief report of the results.

Yes.....No

Thank-you very much for helping me with this questionnaire.

LOCAL RESEARCH ETHICS COMMITTEE

5

2 October 1996

Mr K Meares
Trainee Clinical Psychologist
Oxford Regional Training Course in Clinical Psychology
Isis Education Centre, Warneford Hospital
Headington OXFORD OX3 7jx

Dear Mr Mears

AN EXPLORATORY INVESTIGATION INTO THE PSYCHOLOGICAL AFTER-EFFECTS AND NEEDS AMONG ADOLESCENTS INVOLVED IN ROAD TRAFFIC ACCIDENTS

Thank you for your letter dated 10 September regarding the above trial in which you informed the Local Research Ethics Committee that you will be the named researcher for the project and also gave details of proposed changes to the number and type of questionnaires to be used.

Your letter was passed to the Chairman of the Committee and I am pleased to inform you that ethical approval has been given. The Committee wishes you success with the study and Members look forward to receiving copies of any publications arising from the research.

Secretary
Local Research Ethics Committee

Medical Research/Ethics Committee

Secretary

Our Ref: JB/MS/97/12

25 April 1997

Mr Kevin Meares
Trainee Clinical Psychologist
Oxford Regional Training Course in Clinical Psychology
Isis Education Centre
Warneford Hospital
Headington
OXFORD
OX3 7JX

Dear Mr Meares

97/12 CRISIS SUPPORT, INTRUSIVE THOUGHTS AND PTSD SYMPTOMS IN ADOLESCENTS INVOLVED IN ACCIDENTS

Thank you for your recent letter, clarifying the points raised by the Committee in respect of the abbreviations used in the Structured Interview document. I also note the addition of a statement of confidentiality within the document.

I will notify the Committee of your response at their next meeting on 8 May 1997.

Yours sincerely

Secretary, Northampton Medical Research/
Ethics Committee

Appendix: 6.5 GP Letter

«Code»

July 15, 1997

Dr. «GP»
«GPAdd1»
«GPADD2»
«GPADD3»
«GPPOSTCODE»

Dear Dr. «GP»,

RE: «Surname», «First»: «DOB»
«PATADD1»«PATADD2»«PATADD3»

Your patient was seen at the Casualty Department of ********** General Hospital on «Date_Seen». According to the Casualty Department's database your patient sustained «Type2».

We are conducting research into the psychological after-effects of accidents and are interested in interviewing children aged between 11 and 15 years of age who have been involved accidents while riding bicycles, as pedestrians or passengers in motor vehicle accidents.

We would like to approach your patient to interview him/her about the after-effects of their accident. If you feel we can approach your patient could please complete the form below and return it to us in the SAE provided. We will of course direct them to appropriate local services for counselling should it be thought appropriate.

If you feel it is appropriate please forward the enclosed letter to your patient to enable them to contact us should they wish to.

In my opinion my patient..... may / may not* be approached by yourselves for the purpose of carrying out the interview into the psychological effects of road traffic accidents (*Delete as applicable).

Signed..... Practice Stamp

Please return this form in the SAE provided.

Thank you for your time and consideration.

Yours sincerely

Consultant in Accident And Emergency Medicine	Consultant Psychiatrist	Consultant Clinical Psychologist	Trainee Clinical Psychologist

Appendix: 6.6.1 Letter To Parent

July 15, 1997
«Code»

Mr and Mrs «Surname»
«PATADD1»
«PATADD2»
«PATADD3»

Dear Parent,

This letter has been forwarded to you on our behalf by your GP.

We are conducting research into the psychological effects of accidents and are interested in interviewing children who have been involved in minor and major accidents. These could include accidents involving bicycles, accidents that happen while walking or running or accidents that involve cars or buses.

According to our records, your child was seen at the Casualty Department of ******* General Hospital on «Date_Seen» and was involved in «Type2». We are contacting all the parents of children who have recently involved in accidents to seek their consent to interview their children.

The database only tells us about the type of accident and we have little detail about its severity. You may feel that your child was not distressed by their experience, or that the accident was too minor to have had any psychological effects. We are still interested in interviewing all those involved in accidents however minor or severe, as this may help us when trying to understand what factors help predict whether a child is effected by an accident. Please find enclosed a question and answer sheet about the study which is intended to answer any questions you may have.

After discussing this with your child and if you agree that we can come to interview your child please could you complete the enclosed form and return it in the stamped addressed envelope provided.

After reading the information sheet enclosed with this letter, if you have any further concerns or questions, a message for Mr Kevin Meares can be left at the following number (**********). **Please note that this is a message service only and Mr Meares will endeavour to return your call within 24 hours of receiving your message.** Alternatively you can write to him using the SAE enclosed.

Thank you for your time and consideration.

Yours sincerely

Consultant in Accident and Emergency Medicine	Consultant Clinical Psychologist	Consultant Psychiatrist	Trainee Clinical Psychologist

Appendix: 6.6.2 Consent Form

«Code»

I/We* are willing to let our child, **«First»** be interviewed by Kevin Meares, Trainee Clinical Psychologist for the purpose of investigating the psychological effects of accidents. (*Delete as applicable)

Signed .....Child's Name.....

Address.....

.....

.....

.....

.....

Telephone No. (Inc. code).....

I am willing to be interviewed for the purpose of investigating the psychological after-effects of accidents.

Child Signature.....

If you agree that we can interview your child please return this form in the SAE provided.

THANK-YOU

Appendix: 6.63 Information Sheet

SOME COMMON QUESTIONS AND ANSWERS

You may choose to participate or not to participate in the interview. Your choice will not affect the services provided to you. Even if you chose to participate you are free to withdraw from this study at any point. Your replies will only be known to the research team.

If I have any questions or concerns who can I contact? Kevin Meares will come to interview your child. He is a Trainee Clinical Psychologist who is currently on placement in Oxford and is affiliated to the Department of Child Psychology at ******* General Hospital. A message for Mr Meares can be left at the following number (******). Mr Meares will endeavour to return your call within 24 hours of receiving your message. Alternatively you can write to him using the SAE enclosed.

How did we find out that your child was involved in an accident? ******** General Hospital keeps a database on all those people seen at the accident and emergency department. Among other reasons this database has been created to audit the services and to help plan future services. In addition, the data base also enables researchers to target certain groups of patents for research.

What is this research about? Our research is trying to understand what makes a child vulnerable to developing psychological difficulties after accidents. It is important that we interview children who have been involved in a range of accidents and who have reacted in different ways to these accidents.

What we mean when we talk about an accident? Accidents might include children falling off bicycles. passengers in car accidents, pedestrians, etc.,.

Where will this research take place? Kevin Meares will come to visit your child **after school and at home** at a time that suits you. Your child will be asked to fill in some questionnaires and answer some questions about their accident. The questionnaires and interview take about **30 minutes** to complete.

How will confidentiality be maintained? All questionnaires are marked with a code number only. No names appear on the questionnaires. The data will be reported as group data so it will be impossible to identify individuals.

What will happen to the questionnaire information? We hope to publish this information in a professional journal for other clinicians and practitioners.

What are the benefits for my child? There are no benefits for taking part in this research. We are in the early stages of understanding how children react to accidents. This information will add to the research already on the psychological after-effects of accidents and in the future it may help target those children in most need of help following accidents.

Will we get feedback if we agree to take part? Yes. We plan to summarise the information we gather and pass it on to those who have taken part in this research.

If during the course of the interview, or when we are marking the questionnaires we find that your child is suffering from a higher than usual degree of distress, or that you feel you require further help. we will give you the information you need to find further help for your child.

Consultants in Accident and Emergency Medicine	Consultant Psychologist	Trainee Clinical Psychologist	Consultant Psychologist Research Supervisor

Appendix: 6.7.1

Criteria for the assessment of speed and injury that comprise the accident severity.

SPEED

Speed of Victim was travelling at.

walking	5-15	15-25	25-35	35-45	45-55	55+
1	2	3	4	5	6	7

Speed of other vehicle

5-15	15-25	25-35	35-45	45-55	55-65	65+
1	2	3	4	5	6	7

INJURY

Severity of Injuries.

1	2	3
Mild	**Moderate**	**Severe**
Cuts and bruises Strains Sprains Lacerations	Whiplash Cuts that need stitches Torn Ligaments Chest and Stomach Pains	Broken Bones/Fractures Multiple injuries Loosing consciousness

Appendix: 6.7.2.1

Table. A1: Frequency of collision speeds found in sample.

Speed Range (mph)	Frequency	Percent	Speed Range (mph)	Frequency	Percent
0-5	1	2.9	25-35	3	8.8
5-15	7	20.6	25-40	1	2.9
15-25	7	20.6	30-50	1	2.9
10-30	1	2.9	30-55	1	2.9
15-30	2	5.9	40-60	1	2.9
15-35	2	5.9	50-70	1	2.9
20-40	3	8.8	60-80	3	8.8

Appendix: 6.7.2.2

Table A2: Frequencies, percentages and classification of accident severity scores

Accident Severity Score (N = 34)													
Accident Group	Mild / Moderate (N = 19)					Moderate / Severe (N = 15)							
Composite Score	2	3	4	5	7	8	9	10	12	13	14	15	16
Frequency	1	6	4	5	2	3	2	3	1	1	2	3	1
%	2.9	17.6	11.8	14.7	5.9	8.8	5.9	8.8	2.9	2.9	5.9	8.8	2.9

Appendix: 6.7.3.1

Everyday Intrusive Thoughts (ITQ)

Table A3: Summary of the sample's responses to the six times of the everyday thoughts questionnaire.

Interference With Behaviour		Affective Discomfort		Difficulty of Dismissal	
Never Stop	9 (36)	Pleasant	18 (72)	Easy	16 (64)
Stop Sometimes	16 (64)	Unpleasant	7 (28)	Difficult	9 (36)
Avoid Trigger Situations		**Acceptability To Subject (Guilt/Worry)**		**Frequency**	
Never/Sometimes	7 (28)	A Little/Not Worried or Guilty	17 (68)	1 Per Day/Week	12 (48)
Often/Always	18 (72)	Worried or Guilty	8 (32)	1 Per Month and Less	13 (52)

percentage in brackets

Appendix: 6.7.3.2

Accident Related Intrusive Thoughts (ITQ)

Table A4: Summary of the sample's responses to the six times of the accident related thoughts questionnaire.

Interference With Behaviour		Affective Discomfort		Difficulty of Dismissal	
Never Stop	7 (33)	Pleasant	2 (9.5)	Easy	11 (52.4)
Stop Sometimes	14 (77)	Unpleasant	19 (90.5)	Difficult	10 (47.6)
Avoid Trigger Situations		**Acceptability To Subject (Guilt/Worry)**		**Frequency**	
Never/Sometimes	10 (47.6)	A Little/Not Worried or Guilty	16 (76.2)	1 Per Day/Week	12 (57.1)
Often/Always	11 (52.4)	Worried or Guilty	5 (23.8)	1 Per Month and Less	9 (42.9)

percentage in brackets

Test-retest Reliability for the ITQ and CSQ

Appendix: 6.8.1

Table A5: Percentage agreement and Cohen's Kappa for ITQ scores at Time 1 and Time 2. (N=1).

Time 2 / Item	Time 1 ITQIT	ITQ1	ITQ2	ITQ3	ITQ4	ITQ5	ITQ6
Do you have intrusive thoughts?	73.8% (.28 ^{ns})[a]						
1. Interference with behaviour		46.2% (.204^{ns})					
2. Affective discomfort			77% (.621**)				
3. Ease of dismissal				77.3% (.625**)			
4. Avoidance of Situations					76.9% (.536*)		
5. Acceptability to Participant						76.9% (.492^{ns})	
6. Frequency							31% (.041 ^{ns})

[a] = Cohen's Kappa; *p<.05; **p<.01; *ns* = non-significant.

Appendix: 6.8.2

Table A6: Test-retest data for the crisis support questionnaire (N=19)

ITEM	Correlation	d.f.	t
1. Whenever you wanted to talk how often was there someone willing to listen after the accident?	0.686**	18	1.0^{ns}
2. Did you have personal contact with others people with a similar experience just after the accident?	0.221 ^{ns}	18	-.425 ^{ns}
3. Were you able to talk about your thoughts and feelings just after the accident?	0.374 ^{ns}	18	-.592 ^{ns}
4. Were people supportive and sympathetic just after the accident?	0.767***	18	-.524 ^{ns}
5. Were people helpful in a practical sort of way just after the accident?	0.323 ^{ns}	18	-.265 ^{ns}
6. Did people you expected to feel supportive make you feel worse at any time after the accident?	0.469*	18	0.459^{ns}
TOTAL SCORE	**0.591****	**18**	**1.349 ^{ns}**

* = p<.05; ** = p<.01; *** = p<.001; ^{ns} = non-significant

Inter-rater reliability for the severity of injury classification system.

Appendix: 6.8.3

Table A7: Percentage agreement and Kappa values for inter-rater reliability check on severity of injury classification.

Raters	1	2	3
1	-	81.8% (.706[a])***	75.7% (.617)***
2		-	72.7% (.581)***

[a] = Cohen's Kappa; *** = $p<.001$.

Concurrent validity; Global severity and composite accident severity score.

Appendix: 6.8.4

Table A8: Assessing concurrent validity; Correlations between composite severity score and global severity ratings.

Raters	1	2	3	Composite Score
1	-	.743 (.59-.69[a])**	.722 (.56-.88)**	.666***(.85-.47)
2		-	.628 (.42-.83)**	.712***(.87-.54)
3			-	.718***(.88-.55)

[a] = Confidence Intervals; ** = $p<.01$.

Appendix: 6.9.1.1

Table. A9: Comparisons between those participants who reported everyday intrusive thoughts and those who did not on measures of PTSD symptomology.

Do You Experience Everyday Intrusive Thoughts?	Category		Mean	(SD)	df	t	p
Arousal	Yes	N=24	4.87	4.53	32	1.06	NS
	No	N=10	3.2	3.01			
Depression	Yes	N=24	9.7	5.4	32	1.33	NS
	No	N=10	7.2	3.7			
Anxiety	Yes	N=24	13.37	6.26	32	0.612	NS
	No	N=10	11.9	6.70			
IES Intrusion	Yes	N=24	9.1	8.17	32	1.92	NS
	No	N=10	3.7	5.61			
IES Avoidance	Yes	N=24	13.79	10	32	2.45	0.02
	No	N=10	5.7	4.19			
IES Total	Yes	N=24	22.95	16.72	32	2.42	0.02
	No	N=10	9.4	8.14			
Age	Yes	N=24	13.76	1.54	32	0.76	NS
	No	N=10	12.38	1.44			

Appendix: 6.9.1.2

Table A10: Comparisons between those participants who reported accident related intrusive thoughts and those who did not on measures of PTSD symptomology.

Do You Have Accident Related Intrusive Thoughts?	Category		Mean	(SD)	df	t	p
Arousal	Yes	N=21	6.33	4.11	32	4.28	0.0002
	No	N=13	1.2	1.48			
Depression	Yes	N=21	10.47	5	32	2.36	0.002
	No	N=13	6.53	4.23			
Anxiety	Yes	N=21	15.38	5.1	32	3.23	0.003
	No	N=13	9	6.2			
IES Intrusion	Yes	N=21	11.14	8.03	32	4.12	0.0002
	No	N=13	1.76	1.69			
IES Avoidance	Yes	N=21	13.9	9.2	32	2.05	0.04
	No	N=13	7.39	8.5			
IES Total	Yes	N=21	25.04	16.54	32	3.20	0.003
	No	N=13	9.15	8.30			
Age	Yes	N=21	13.76	1.54	32	2.58	0.014
	No	N=13	12.23	1.44			

*p<.05; **p<.01; ***p<.001; *ns* = non-significant

Appendix: 6.9.2.1

Table A11: Summary of symptom means for participants grouped by level of controllability of everyday intrusive thoughts.

i. Interference with Behaviour

PTSD Symptom Measures	Category		Mean	(SD)	df	t	p
Arousal	Never Interferes	N=9	1.89	2.57	23	-2.83**	0.009
	Can Interfere	N=16	6.5	4.46			
Depression	Never Interferes	N=9	6.71	5.02	23	-2.11*	0.046
	Can Interfere	N=16	10.83	5.07			
Anxiety	Never Interferes	N=9	8.43	5.97	23	-0.61 ns	0.08
	Can Interfere	N=16	15.06	5.35			
IES Intrusion	Never Interferes	N=9	5	9.15	23	-2.42*	0.04
	Can Interfere	N=16	12.13	6.67			
IES Avoidance	Never Interferes	N=9	7.89	9.66	23	-2.4*	0.03
	Can Interfere	N=16	16.88	8.58			
IES Total	Never Interferes	N=9	12.89	18.16	23	-2.62*	0.015
	Can Interfere	N=16	29	12.48			

ii. Ease of Dismissal

	Category		Mean	(SD)	df	t	p
Arousal	Easy No Effort	N=16	3.62	3.79	23	-1.924 ns	0.06
	Easy Some Effort	N=9	7.00	4.89			
Depression	Easy No Effort	N=16	7.75	4.58	23	-2.738*	0.012
	Easy Some Effort	N=9	13.11	4.91			
Anxiety	Easy No Effort	N=16	11.13	5.99	23	-2.454*	0.022
	Easy Some Effort	N=9	16.89	4.91			
IES Intrusion	Easy No Effort	N=16	5.38	5.06	23	-4.585***	<0.0001
	Easy Some Effort	N=9	17	7.65			
IES Avoidance	Easy No Effort	N=16	10.44	8.81	23	-2.734*	0.26
	Easy Some Effort	N=9	19.33	9.33			
IES Total	Easy No Effort	N=16	15.81	11.5	23	-3.713***	0.001
	Easy Some Effort	N=9	36.33	16.06			

iii. Avoiding situations that trigger intrusive thoughts.

	Category		Mean	(SD)	df	t	p
Arousal	Never Avoids	N=7	1.286	1.25	23	-2.83**	0.09
	Avoids	N=18	6.22	4.47			
Depression	Never Avoids	N=7	6.71	5.02	23	-1.829 ns	0.08
	Avoids	N=18	10.83	5.07			
Anxiety	Never Avoids	N=7	8.43	5.97	23	-0.61*	0.013
	Avoids	N=18	15.06	5.35			
IES Intrusion	Never Avoids	N=7	2.86	2.97	23	-2.9**	0.008
	Avoids	N=18	12.17	8.19			
IES Avoidance	Never Avoids	N=7	12	9.78	23	-1.46 ns	0.16
	Avoids	N=18	27.56	16.59			
IES Total	Never Avoids	N=7	12	9.78	23	-2.3*	0.03
	Avoids	N=18	27.56	16.59			

*p<.05; **p<.01; ***p<.001; *ns* = non-significant

Appendix: 6.9.2.2

Table A12: Summary of symptom means for participants grouped by level of emotional discomfort caused by everyday intrusive thoughts.

Affective Discomfort	**Category**		Mean	(SD)	df	t	p
IES Intrusion	Pleasant	N=7	6.72	6.44	23	-3.27	0.003
	Unpleasant	N=18	16.86	8.23			
IES Total	Pleasant	N=7	18.72	14.08	23	-2.39*	0.025
	Unpleasant	N=18	34.71	17.38			

Acceptability to subject	**Category**		Mean	(SD)	df	t	p
Arousal	OK to have them	N=17	3.58	3.16	23	-2.21*	0.035
	Not OK	N=8	7.5	5.37			
Depression	OK to have them	N=17	6.71	5.02	23	-2.23*	0.036
	Not OK	N=8	10.83	5.07			
Anxiety	OK to have them	N=17	8.43	5.97	23	-2.18*	0.039
	Not OK	N=8	15.06	5.35			
IES Intrusion	OK to have them	N=17	7.12	6.83	23	-2.34*	0.027
	Not OK	N=8	14.75	9			
IES Avoidance	OK to have them	N=17	10.53	8.97	23	-2.56*	0.017
	Not OK	N=8	20.25	8.58			
IES Total	OK to have them	N=17	17.65	13.43	23	-2.79**	0.01
	Not OK	N=8	35	16.68			

*p<.05; **p<.01; ***p<.001; *ns* = non-significant

Appendix: 6.9.2.3

Table A13: Summary of symptom means for participants grouped by frequency of everyday intrusive thoughts.

Frequency	Category		Mean	(SD)	df	t	
Arousal	1 per hour/day	N=12	6.33	4.47	23	-1.69	NS
	1 per week/month	N=13	3.42	4.09			
Depression	1 per hour/day	N=12	10.75	5.36	23	-0.96	NS
	1 per week/month	N=13	8.69	5.25			
Anxiety	1 per hour/day	N=12	14.5	6.07	23	-1.007	NS
	1 per week/month	N=13	12	6.31			
IES Intrusion	1 per hour/day	N=12	12.67	8.73	23	-1.9	NS
	1 per week/month	N=13	6.69	6.88			
IES Avoidance	1 per hour/day	N=12	15.58	10.27	23	-0.94	NS
	1 per week/month	N=13	11.85	9.43			
IES Total	1 per hour/day	N=12	28.25	18.34	23	-1.51	NS
	1 per week/month	N=13	18.54	13.39			

*p<.05; **p<.01; ***p<.001; *ns* = non-significant

Appendix: 6.9.3.1

Table A14: Summary of symptom means for participants grouped by level of controllability of accident related intrusive thoughts.

1. Interference with Behaviour

	Category		Mean	(SD)	df	t
Arousal	Never Interferes	N=7	6.85	3.43	19	0.404 ns
	Can Interfere	N=14	6.07	4.5		
Depression	Never Interferes	N=7	9.86	4.53	19	-0.39 ns
	Can Interfere	N=14	10.79	5.37		
Anxiety	Never Interferes	N=7	17.14	5.98	19	1.13 ns
	Can Interfere	N=14	14.5	4.69		
IES Intrusion	Never Interferes	N=7	9.57	10.00	19	-0.624 ns
	Can Interfere	N=14	11.93	7.16		
IES Avoidance	Never Interferes	N=7	11.00	10.34	19	-1.024 ns
	Can Interfere	N=14	15.36	8.61		
IES Total	Never Interferes	N=7	9.57	20.05	19	-0.871 ns
	Can Interfere	N=14	11.93	14.85		

3. Ease of Dismissal

	Category		Mean	SD	df	t
Arousal	Easy No Effort	N=11	4.818	3.34	19	-1.87 ns
	Easy Some Effort	N=10	8.00	4.39		
Depression	Easy No Effort	N=11	8.82	3.63	19	-1.66 ns
	Easy Some Effort	N=10	12.30	5.83		
Anxiety	Easy No Effort	N=11	13.36	5.08	19	-2.01 ns
	Easy Some Effort	N=10	17.6	4.48		
IES Intrusion	Easy No Effort	N=11	7.09	5.89	19	-2.809*
	Easy Some Effort	N=10	15.60	7.93		(p = 0.011)
IES Avoidance	Easy No Effort	N=11	7.45	5.87	19	-4.99***
	Easy Some Effort	N=10	21.00	6.57		(p = <0.001)
IES Total	Easy No Effort	N=11	14.55	10.73	19	-4.067***
	Easy Some Effort	N=10	36.6	14.05		(p = 0.001)

4. Avoiding situations that trigger accident related intrusive thoughts

	Category		Mean	(SD)	df	t
Arousal	Never Avoids	N=10	7.00	4.76	19	0.699 ns
	Avoids	N=11	5.72	3.55		
Depression	Never Avoids	N=10	12.60	5.19	19	1.98 ns
	Avoids	N=11	8.55	4.16		
Anxiety	Never Avoids	N=10	15.70	6.09	19	0.264 ns
	Avoids	N=11	15.09	4.44		
IES Intrusion	Never Avoids	N=10	11.50	5.1	19	0.189 ns
	Avoids	N=11	10.82	10.27		
IES Avoidance	Never Avoids	N=10	13.70	7.66	19	-0.095 ns
	Avoids	N=11	14.09	10.79		
IES Total	Never Avoids	N=10	25.20	11.66	19	0.039 ns
	Avoids	N=11	24.91	20.62		

Appendix: 6.9.3.2

Table 15: Summary of symptom means for participants grouped by the level of emotional discomfort caused by accident related intrusive thoughts

	Category		Mean	(SD)
Arousal	Pleasant	N=2	11.5	0.707
	Unpleasant	N=19	5.57	3.94
Depression	Pleasant	N=2	13.00	1.41
	Unpleasant	N=19	10.21	5.19
Anxiety	Pleasant	N=2	19.50	3.45
	Unpleasant	N=19	14.95	5.18
IES Intrusion	Pleasant	N=2	16.00	0.00
	Unpleasant	N=19	10.63	8.3
IES Avoidance	Pleasant	N=2	21.00	1.41
	Unpleasant	N=19	13.16	9.37
IES Total	Pleasant	N=2	13.00	1.41
	Unpleasant	N=19	10.21	5.19
Acceptability to subject				
	Category		Mean	(SD)
Arousal	OK to have them	N=16	5.87	3.70
	Not OK	N=5	7.8	5.4
Depression	OK to have them	N=16	9.75	3.92
	Not OK	N=5	12.80	7.66
Anxiety	OK to have them	N=16	14.25	4.88
	Not OK	N=5	19.00	4.74
IES Intrusion	OK to have them	N=16	10.06	6.48
	Not OK	N=5	14.60	12.10
IES Avoidance	OK to have them	N=16	7.83	1.96
	Not OK	N=5	12.66	5.66
IES Total	OK to have them	N=16	13.32	3.33
	Not OK	N=5	24.48	10.95

Appendix: 6.9.3.3

Table A16: Summary of symptom means for participants grouped by frequency of accident related intrusive thoughts.

	Category		Mean	(SD)	df	t
Arousal	1 per hour/day	N=12	7.66	4.397	19	1.809 ns
	1 per week/month	N=9	4.55	3.08		
Depression	1 per hour/day	N=12	10.50	5.87	19	0.025 ns
	1 per week/month	N=9	10.44	3.91		
Anxiety	1 per hour/day	N=12	15.42	6.26	19	0.036 ns
	1 per week/month	N=9	15.33	3.57		
IES Intrusion	1 per hour/day	N=12	14.67	7.66	19	2.64*
	1 per week/month	N=9	6.44	6.13		(p = 0.016)
IES Avoidance	1 per hour/day	N=12	18.67	8.26	19	3.37**
	1 per week/month	N=9	7.56	6.21		(p = 0.003)
IES Total	1 per hour/day	N=12	33.33	15.17	19	3.2**
	1 per week/month	N=9	14.00	11.29		(p = 0.005)

Appendix: 6.9.4

Table A17: Results for those participants who did or did not talk about their accident related intrusive thoughts.

PTSD Symptoms	Response	N	Mean	SD	df	t
Arousal	Talked	N=8	6.87	4.48	32	2.021^{ns}
	Did not Talk	N=26	3.61	3.38		
IES Total	Talked	N=8	35.38	17	32	4.04***
	Did not Talk	N=26	13.92	11.82		p = <0.0001
IES Intrusion	Talked	N=8	16.25	9.07	8.44[a]	3.38**
	Did not Talk	N=26	4.88	5.16		p = 0.009
IES Avoidance	Talked	N=8	19.13	9.20	32	2.94**
	Did not Talk	N=26	9.04	8.26		p = 0.006
Depression	Talked	N=8	10.38	6.5	32	0.897^{ns}
	Did not Talk	N=26	8.54	4.58		
Anxiety	Talked	N=8	16	5.56	32	1.598^{ns}
	Did not Talk	N=26	12	6.32		

*p<.05; **p<.01; ***p<.001; *ns* = non-significant; [a] = Unequal variance statistic used.

Appendix: 6.9.5

Multiple Regression Analyses: Equations

General Equation For Multiple Regression Analyses;

$$Y = B_o + B_1X_1 + B_2X_2 \ldots\ldots B_nX_n$$

Where Y = Dependent Variable B_o = B Constant, B_1 = Value of B for first predictor. X_1 = Value of first predictor.

Table A18: Summary table of equations for the stepwise multiple regression analyses.

1. IES Total = -2.08 + 34.23 * Fast Collison Speed + 15.74 * Medium Collision Speed + -17.63 * Severe Injury + 9.09 Affective Discomfort.
2. IES Intrusion = 6.35 + 12.46 * Fast Collision Speed + 6.225 * Affective Discomfort + -5.09 * Frequency
3. IES Avoidance = 32.67 + -9.28 * Slow Collision Speeds + -9.33 * Threat To Life
4. Arousal = 12.89 + -6.6 * Life Threat + 3.54 * Interference with behaviour + -3.69 * Falling off cycle + -3.739 * fast collision speed
5. Depression = 17.665 + -0.464 * Crisis Support Total + 4.623 * Acceptability to Participant
6. Anxiety = 10.33 + 7.17 * Moderate Injury Score.